



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

3 LG 961
.H42
B482827 H

College of Hawaii Publications.

COLLEGE RECORDS

NUMBER 15

COLLEGE OF HAWAII
BIENNIAL CATALOGUE
1916-1918



HONOLULU:
PUBLISHED BY THE COLLEGE
NOVEMBER, 1916

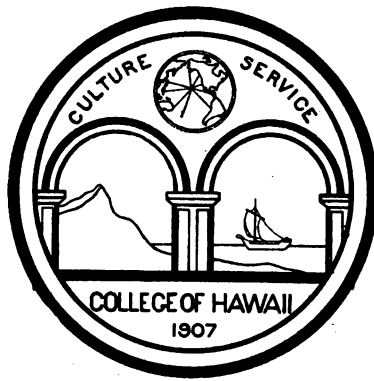


College of Hawaii Publications.

COLLEGE RECORDS

NUMBER 15

COLLEGE OF HAWAII
BIENNIAL CATALOGUE
1916-1918



HONOLULU:
PUBLISHED BY THE COLLEGE
NOVEMBER, 1916

CALENDAR

1916-1919.

1916

September 11	Academic year begins	Monday
September 16	Regatta Day (Hawaiian holiday)	Saturday
October 2	Last day of registration for advanced degrees	Monday
Nov. 30-Dec. 2	Thanksgiving recess	Thurs.-Sat.
December 25	Christmas recess begins	Monday

1917

January 8	Work resumed	Monday
January 22-27	Mid-year examinations	Monday-Sat.
January 27	First semester ends	Saturday
January 29	Second semester begins	Monday
February 22	Washington's Birthday	Thursday
April 16	Last day to make requests for examinations for advanced degrees	Monday
May 28-June 2	Final examinations	Monday-Sat.
May 30	Memorial Day	Wednesday
June 2	Second semester ends	Saturday
June 2	College banquet	Saturday
June 4	Sixth Annual Commencement	Monday
September 10	Academic year begins	Monday
September 15	Regatta Day (Hawaiian holiday)	Saturday
October 1	Last day of registration for advanced degrees	Monday
Nov. 29-Dec. 1	Thanksgiving recess	Thurs.-Sat.
December 24	Christmas recess begins	Monday

1918

January 7	Work resumed	Monday
January 21-26	Mid-year examinations	Monday-Sat.
January 26	First semester ends	Saturday
January 28	Second semester begins	Monday
February 22	Washington's Birthday	Friday

Calendar.

3

April 15	Last day to make requests for examinations for advanced degrees	Monday
May 27-June 1	Final examinations	Monday-Sat.
May 30	Memorial Day	Thursday
June 1	Second semester ends	Saturday
June 1	College banquet	Saturday
June 3	Seventh Annual Commencement	Monday
September 9	Academic year begins	Monday
September 14	Regatta Day (Hawaiian holiday)	Saturday
September 30	Last day of registration for advanced degrees	Monday
Nov. 28-30	Thanksgiving recess	Thurs.-Sat.
December 23	Christmas recess begins	Monday
1919		
January 6	Work resumed	Monday
January 20-25	Mid-year examinations	Monday-Sat.
January 25	First semester ends	Saturday
January 27	Second semester begins	Monday
February 22	Washington's Birthday	Saturday
April 15	Last day to make requests for examinations for advanced degrees	Monday
May 26-31	Final examinations	Monday-Sat.
May 30	Memorial Day	Friday
May 31	Second semester ends	Saturday
May 31	College banquet	Saturday
June 2	Eighth Annual Commencement	Monday

REGISTRATION DAYS, 1916-1919.

1916-1917.

Monday, September 11—Registration for *First Semester*.

Monday, January 29—Registration for *Second Semester*.

1917-1918.

Monday, September 10—Registration for *First Semester*.

Monday, January 28—Registration for *Second Semester*.

1918-1919.

Monday, September 9—Registration for *First Semester*.

Monday, January 27—Registration for *Second Semester*.

RULES OF ADMISSION.

1. All candidates for matriculation should first make application to the Committee on Entrance.

Such applications should not be deferred until Registration Day, but should be made at the earliest day possible.

2. Candidates will be admitted as *Regular Students*: (a) by presenting a certificate issued by an accredited school; (b) by transfer from another college or university; (c) by presenting 15 entrance credits.

3. Candidates will be admitted as *Special Students* by filing with the Committee on Entrance satisfactory evidence of previous training and a statement of the courses desired.

4. A Late Registration Fee of \$1.00 will be required of all students who register later than the announced registration days.

A fuller presentation of the rules governing the admission of students appears on pp. 14-17.

Application forms will upon request be furnished by the Committee on Entrance.

Hawaii Univ. Lib.

gt.

11-2-1923

Board of Regents.

5

**BOARD OF REGENTS OF THE
COLLEGE OF HAWAII**

	Date of Appointment and Reappointment	Present Term Expires
Alonzo Gartley	May 1, 1907 Apr. 30, 1910 Apr. 30, 1915	
C. R. Hemenway	Oct. 6, 1910 Apr. 30, 1916	Apr. 30, 1920 Apr. 30, 1921
W. R. Farrington	May 21, 1914	Apr. 30, 1917
Mrs. J. R. Ashford	May 21, 1914	Apr. 30, 1919
F. L. Waldron	Oct. 19, 1914	Apr. 30, 1918

OFFICERS OF THE BOARD.

Chairman: W. R. Farrington.

Secretary: A. L. Dean.

THE FACULTY

- ARTHUR L. DEAN, A. B. (Harvard '00), Ph.D.
(Yale '02).
President, and Professor of Chemistry. Telephone
2056 Lanihuli Drive. 5296
- JOHN S. DONAGHHO, A. B. (Marietta '89), A. M.
(Marietta '97).
Professor of Mathematics and Astronomy.
Alewa Heights. 1914
- JOHN M. YOUNG, B. S. (Univ. Florida '98), M. E.
(Cornell '02), M. M. E. (Cornell '04).
Professor of Engineering, Engineer for the College.
Alewa Heights. 3571
- WILLIAM A. BRYAN, B. S. (Iowa State College '96).
Professor of Zoölogy.
1013 Punahou St. 4125
- ARTHUR R. KELLER, C. E. (Cornell '03), LL. B.
(National Univ. '06), S. M. C. E. (Harvard '16),
M. S. (Mass. Inst. Tech. '16).
Professor of Civil Engineering.
2066 Lanihuli Drive.
- FRANK T. DILLINGHAM, B. S. (Worcester Polytechnic
Institute '01), M. A. (Yale '16).
Professor of Chemistry.
2221 Kalia Road. 7116
- ARTHUR L. ANDREWS, B. L. (Cornell '93), M. L.
(Cornell '95), Ph. D. (Cornell '02).
Professor of English.
2346 Liloa Rise. 1643
On leave of absence, first semester, 1916-17.
- *ANNETTA DIECKMANN, A. B. (Cornell '09).
Instructor in English.
2146 Lanihuli Drive 2156

*Substituting for Professor Andrews, first semester, 1916-17.

The Faculty.

7

- VAUGHAN MacCAUGHEY, B. S. A. (Cornell '08).
Professor of Botany.
 2406 Oahu Avenue. 2106
 On leave of absence, first semester, 1916-17.
- JAY M. KUHNS, M. D. (Washington Univ. '15).
Instructor in Bacteriology.
 Queen's Hospital.
- JAMES F. ILLINGWORTH, B. S. (Pomona '00),
 M. A. (Stanford '01), Ph. D. (Cornell '12).
Professor of Entomology.
 Palolo Valley.
- HERBERT S. WALKER, A. B. (Univ. of Chicago '01).
Professor of Sugar Technology.
 2039 Vancouver Highway. 5514
- JOSEPH F. C. ROCK (Vienna University, Austria).
Botanist.
 The Pleasanton. 4927
- MINNIE E. CHIPMAN (Woman's Art School, N. Y.).
Professor of Ceramics and Design.
 On leave of absence, first semester, 1916-17.
- *KATHERINE H. SCOTT (Graduate Chicago
 Art Institute '01).
Instructor in Ceramics and Design.
 2065 Lanihuli Drive. 3782
- ARNOLD ROMBERG, A. B. (Texas '10),
 Ph. D. (Harvard '15).
Professor of Physics.
 2136 Kamehameha Ave. 2788
- LOUIS A. HENKE, B. S. (University of
 Wisconsin '12).
Professor of Agriculture.
 Y. M. C. A. 1340
- FLORENCE M. LEE, B. S. (Teachers' College,
 Columbia University).
Assistant Professor of Domestic Science.
 The Courtland. 1934

* Substituting for Professor Chipman, first semester, 1916-17.

LESLIE C. CLARK, B. S. (College of Hawaii '12). <i>Assistant Professor of Animal Husbandry.</i> 2625 Kuahine Drive.	4075
MARIA HEUER, (Neuchatel, Sorbonne, College of Modern Languages, Berlin). <i>Assistant Professor of Modern Languages.</i> 2658 Manoa Road.	5027
MILDRED M. YODER, Ph. B. (Oberlin '94). <i>Instructor in History and Economics.</i> Alewa Heights.	4632
JOHN McTAGGART. <i>Instructor in Shop Work.</i> 1278 Punchbowl St.	2033
ALICE E. HARBAUGH. <i>Assistant in Drawing and Ceramics.</i> Alewa Heights.	3385
ELIZABETH L. BRYAN, Sc. D., (Alfred University, <i>Honorary '06).</i> <i>Librarian.</i> 1013 Punahou St.	4125

STANDING COMMITTEES OF THE FACULTY.

Entrance and Advanced Standing:

Professors Walker, Romberg, Henke.

Graduate Work:

Professors Illingworth, Dillingham, Young.

Student Activities:

Faculty members of Executive Committee of the A. S. C. H.,
Asst. Professors Heuer and Clark.

Buildings and Grounds:

Professor Young, Mr. Rock, Asst. Professor Lee.

Discipline and Standing:

Professors Bryan and Donaghho, and Mr. McTaggart.

Publications:

Professors Romberg, Illingworth, and Miss Yoder.

THE COLLEGE OF HAWAII

HISTORY.

The College of Hawaii is a scientific school of collegiate grade giving courses leading to degrees in Agriculture, Civil and Mechanical Engineering, Sugar Technology, and General Science, including the Physical and Biological Sciences and Domestic Arts and Sciences. It bears the same relation to the Territory of Hawaii that the various state colleges and universities bear to their respective states.

The bill creating the College of Hawaii was enacted by the Legislature of the Territory of Hawaii in 1907, and was amended in 1911 (Act 24, Session Laws of the Legislature of Hawaii, 1907, as amended by Act 44, Session Laws, 1911). Temporary buildings were erected on the grounds of the McKinley High School, and there the first classes were organized in the spring of 1908. For the permanent site of the College some ninety acres of land in Manoa Valley were acquired, and the Legislature of 1911 appropriated \$75,000 for the construction and furnishing of a college building, which was made ready for occupancy in the fall of 1912.

The first baccalaureate degrees were awarded in 1912, and the first advanced degree, Master of Science, in 1914. The total number of degrees conferred at the five Commencements is eighteen.

SUPPORT AND ORGANIZATION.

Being a Territory, Hawaii does not benefit financially by the Land Grant Act of 1862; but it does benefit by the Morrill Act of 1890, which supplements the previous act by an appropriation of twenty-five thousand dollars per year. It also benefits from the Nelson Amendment to the Morrill Act, passed in 1907. By virtue of these two acts, the College of Hawaii now receives from the Federal Treasury fifty thousand dollars annually.

According to the terms of these acts, the funds appropriated are "to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of

mathematical, physical, natural and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction." The purchase from this money of apparatus, machinery, text-books, reference books, stock and material used in instruction, or for the purposes of illustration in connection with any of the branches enumerated, and the payment of salaries of instructors in said branches is authorized.

The expenditure of any portion of these funds for the purchase, erection, preservation or repair of any building or buildings, or for the purchase of land, is prohibited.

The salaries of purely administrative officers, such as the president, treasurer, secretaries, bookkeepers, janitors, watchmen, etc., cannot be charged to this fund, nor can it be expended for furniture, cases, shelving, desks, lockers, salaries for instruction in philosophy, psychology, ethics, logic, history, political science, civics, pedagogy, and in ancient and modern languages (except English).

The Territory, therefore, provides lands and buildings and cares for the maintenance and improvement of all the property. In addition to this it devolves on the Territory to provide for the salaries for the administration of the College, for the librarian, clerical help, and for instruction in those subjects not provided for by Federal funds, such as modern languages (except English) and the various non-vocational subjects provided for in the curriculum.

ADMINISTRATION.

By the terms of the Legislative Act creating the College of Hawaii, the general control of the College is given to a Board of Regents appointed by the Governor of the Territory. These Regents, five in number, "shall be residents of the Territory of Hawaii, and shall be appointed for terms of five years, or the unexpired period thereof, in such manner that the term of one Regent shall expire each year."

LOCATION, GROUNDS, AND BUILDINGS.

The College, now advantageously situated in Manoa Valley, one of the most attractive of Honolulu's residential suburbs, is about two and one-half miles from the business center, and but

a short walk from the Manoa Valley car-line. The natural surroundings are beautiful and unique, for the College looks out upon rugged mountains, the grim outlines of an extinct volcano, Diamond Head, and the far reaches of the Pacific.

Of the ninety acres which comprise the College grounds, some twelve are planted to crops and several large fields are used for pasturage. At the rear of the grounds flows the Manoa stream, which furnishes adequate facilities for irrigation and experimental studies in irrigation, and may be made to provide for work in hydraulics.

Through the generosity of Mr. J. P. Cooke of Honolulu an athletic field has been constructed adjacent to the main building. This provides for football, baseball, and track athletics. An asphalt tennis court has also been built during the past year.

The main College building is of reinforced concrete, three stories in height, and contains some sixty lecture rooms, class rooms, offices, and laboratories. In this building are the administrative offices, the library, the laboratories for zoölogy, entomology, physics, botany, bacteriology, sugar technology, and agriculture, a photographic room, the cooking and sewing laboratories and dining room devoted to the work in Domestic Science, the studios and firing-kiln devoted to the work in Ceramics and Art and Design, together with the offices and class rooms for all classes except those in chemistry, wood technology, foundry practice, forging, and experimental engineering. Chemistry and shop work are taken care of in a temporary wooden building, and experimental engineering in the new Engineering Laboratory, a reinforced concrete building erected during the summer of 1915.

In addition to the buildings mentioned, there are several small structures on the campus, an insectary, a slat house and a building for experimental plant studies. On the farm are three buildings for dairy purposes, a piggery, tool shed and three laborers' cottages. At Kaimuki the College has an astronomical observatory. A more detailed account of the equipment of the buildings and laboratories is given under the head of Courses of Instruction.

PURPOSES AND STANDARDS.

As provided in Section 4 of the Act establishing the College: "The purposes of the College are to give thorough instruction

in agriculture, mechanic arts and the natural sciences connected therewith, and such instruction in other branches of advanced learning as the Board of Regents may from time to time prescribe, and to give such military instruction as the Federal Government may require."

This instruction is designed for all persons qualified to profit by it. Section 5 of the Establishing Act provides: "No person shall, because of age, sex, color or nationality, be deprived of the privileges of this institution."

The standard of the College is set in Section 4 of the Establishing Act: "The standard of instruction in each course shall be equal to that given and required by similar colleges on the mainland, and upon the successful completion of the prescribed course the Board of Regents are authorized to confer a corresponding degree upon all students who shall become entitled thereto."

That this standard may be maintained, the requirements for admission of regular students to the College are set as high as those of similar colleges on the mainland (see pp. 14-16).

Special students are admitted only upon presenting satisfactory evidence of previous training. Moreover, no student who has been in attendance at any preparatory school shall be admitted as a special student before his class has graduated, except by special permission of the faculty of the College of Hawaii.

Other restrictions have been made by the faculty with the purpose of maintaining standards. Changes in the work required for a degree are permitted only by action of the faculty upon petition from the student desiring a change, and no past action of the faculty in such matters is allowed any weight.

No student with entrance conditions can be registered as a Sophomore, none with Freshman conditions as a Junior, and none with Sophomore conditions as a Senior.

Students desiring to take only a part of their course in the College of Hawaii may expect to receive credit at the institution to which they transfer for satisfactory work done here. Such credit has invariably been given in the past.

LIBRARY.

The Library now contains about 22,000 volumes of the more recent works on Agriculture, Engineering, and Mechanic Arts,

the various Mathematical, Physical, Chemical and Natural Sciences, as well as an excellent collection of books in English and German Literature. In addition there are on the shelves about 20,000 pamphlets, mostly Bulletins of Agricultural Experiment Stations and of the various departments of the Federal Government. The Library is by law constituted a depository for all Government publications.

A reading room is maintained, wherein may be found local and mainland daily papers, the leading literary magazines and reviews, and a great number of technical and scientific periodicals.

Both the Library and the Reading Room are open to the public; and persons complying with the Library regulations may draw out books for home use.

SEMESTERS AND CREDITS.

The year's work is divided into two semesters of eighteen weeks each. Recognition of work done is given in terms of credits, a credit generally being the equivalent of two and one-half hours per week spent in the preparation and the recitation of a lesson, or in the field or laboratory. The exact division of this time, however, is generally left to the discretion of the professor in charge.

TUITION AND FEES.

Tuition in the College is free to residents of the Territory. To others than residents of the Territory the tuition fee is \$25 a semester. Persons registering as candidates for advanced degrees are charged a matriculation fee of \$5. No matriculation fee is required of undergraduates. A charge of \$5 a semester to cover cost of materials is required of those taking the Courses 1a and 2 in Domestic Science (The Selection and Preparation of Food).

A Late Registration Fee of \$1.00 will be required of all students, other than extension students taking extension courses, who register later than the announced registration days.

CLASSIFICATION OF STUDENTS.

The College of Hawaii recognizes three classes of students:

1. Regular students.
2. Special students.
3. Graduate students.

Regular students are those who are following one of the prescribed courses leading to a degree.

Special students are those who are working for credits, but are not following one of the prescribed courses leading to a degree.

Graduate students are those who have a degree conferred by the College of Hawaii or some other college of equal standing.

REQUIREMENTS FOR ADMISSION.

Distinct entrance requirements are made for each class of students.

ADMISSION OF REGULAR STUDENTS.

Requirements for admission as regular students may be satisfied in any one of three ways.

1. By presenting a certificate of graduation from a standard accredited high school or other institution of standard secondary school grade, together with a transcript of the candidate's school record, issued and signed by the proper school authority.

The one requisite upon which the College insists is that its entering students be prepared to do their college work. The responsibility of determining the courses of study and the methods of teaching that lead to this end rests upon the secondary schools. Schools that graduate pupils unqualified to do college work will not be regarded as accredited schools, and their diploma or certificate of graduation will not be accepted as satisfying entrance requirements.

2. By transfer from another college or university.

Students thus transferring must present an official statement of the studies which they offered for admission, of the studies pursued in college and the grade received in each, and also a certificate of honorable dismissal.

No student will be accredited beyond the Junior year.

3. By presenting 15 approved entrance credits, or their equivalent.

A credit signifies five exercises a week for one academic year. Credits will be given for satisfactory work done in an approved secondary school upon the presentation of the candidate's school record, issued and signed by the proper school authority; for

the passing of College Entrance Board Examinations; and for the passing of examinations set by the College of Hawaii. Persons of some maturity who have had practical experience on sugar plantations, in sugar mills or laboratories, or in some other activity that manifestly prepares them for college work may be given credit for such work. Just what work will be accepted and just how many credits will be given cannot be stated in advance; but each case will be passed upon individually.

For the guidance of those who may wish to enter by presenting 15 credits, a list of the subjects regularly accepted is given.

English	Solid Geometry
German	Plane Trigonometry
French	Astronomy
Latin	Physics
Greek	Chemistry
Oriental Languages and Literature	Botany
United States History	Geology
English History	Physical Geography
Ancient History	Zoölogy
General History	Physiology
Civil Government	Commercial Law
Algebra	Bookkeeping
Plane Geometry	Stenography

The College of Hawaii has sought to make its requirements for admission as flexible as possible without lowering its standards. It does not wish to debar properly qualified students by setting up arbitrary requirements, nor does it wish to dictate to the secondary schools what shall be the precise nature of their courses. At the same time the College refuses to admit to such classes as demand prerequisites any student who cannot satisfy those prerequisites. Two subjects studied in the Freshman year demand prerequisites. These subjects are mathematics and English.

To be admitted to Mathematics 1 a student must have presented $2\frac{1}{2}$ entrance credits in mathematics. To be admitted to Mathematics 3 a student must have presented $3\frac{1}{2}$ credits in mathematics. To be admitted to English 1 a student must have presented at least 3 credits in English.

Since English is required in all courses leading to a degree, and mathematics in all courses except General Science, the advisability of coming prepared to take these courses is obvious.

A knowledge of elementary physics is required of all regular students. Regular students entering without credit in elementary physics are required to take Physis 1 during their first year in addition to the subjects regularly required.

Students wishing to enter an advanced course in one of the modern languages must offer at least two credits in that language. Students offering two or more credits in one of the modern languages will not be permitted to register in the elementary course in that language.

In all courses the work of the Freshman year has been planned so as to permit of an easy transition from school to college. The only prescribed Freshman studies that demand prerequisites are mathematics and English.

ADMISSION OF SPECIAL STUDENTS.

Persons not less than eighteen years of age will be admitted to the College as special students, either at the beginning of the College year or at the beginning of the second semester, provided they furnish satisfactory evidence of previous training and a detailed statement of courses desired. Previous training shall be deemed satisfactory that manifestly enables the student to carry on the work chosen. No student, however, who has been in attendance at any preparatory school shall be admitted as a special student before his class has graduated, except by special permission of the Faculty of the College of Hawaii.

ADMISSION OF GRADUATE STUDENTS.

The requirements for admission as a graduate student are stated in conjunction with the requirements for receiving an advanced degree (see pp. 17-19).

APPLICATIONS FOR ADMISSION.

Candidates for admission to the College of Hawaii should make application either in person or by letter to the Committee on Entrance. Such application should not be deferred until regis-

tration week, but should be made at the earliest possible date.

Persons expecting to enter without examination should submit a detailed statement, issued and signed by a proper school authority, of all subjects studied by the applicant, and the grade attained in each. This statement should be accompanied, upon request, by the catalogue of the school or an outline of its courses of study. The necessary blanks may be had by applying to the Committee on Entrance.

COURSES.

The College of Hawaii, without excluding ideals of scholarship and culture, fosters education for service, and emphasizes for its students and for those interested in its welfare the fact that all vocations or activities by which men and women obtain a living or from which they derive æsthetic stimulus have elements of educational value, that all work productive of good is dignified, and that men and women should be educated toward wholesome service rather than away from it.

To this end, the College offers instruction in the following courses, namely:

1. A course in Agriculture.
2. Courses in Civil and Mechanical Engineering.
3. A course in General Science, including the Biological and Physical Sciences, and Domestic Arts and Sciences.
4. Courses in Sugar Technology: (A) Agricultural Division, emphasizing Agricultural phases; (B) Engineering Division, emphasizing Engineering phases.

Details of these courses follow (see page 21).

BACCALAUREATE DEGREES.

On the satisfactory completion of a regular course a student is given the degree of Bachelor of Science, the diploma designating the course which has been pursued.

ADVANCED DEGREES.

Special attention is directed to the unusual advantages of Hawaii for research in botany, entomology, marine zoölogy, and certain phases of geology. The great variations in elevation, rain-

fall and temperature to be found within short distances provide remarkable conditions for ecological studies. The presence of active and extinct volcanoes, lava flows of all ages and unique conditions of erosion provide numerous interesting geological problems. Advanced students from other institutions and investigators desiring to study special problems, are invited to make use of the facilities of the College of Hawaii for study and research.

The advanced degrees of Master of Science (M. S.), Master of Science in Agriculture (M. S. A.) will be granted to Bachelors who shall have completed the corresponding undergraduate course herein outlined, or its equivalent, on the satisfactory completion of at least one year of resident graduate work, the presentation of an acceptable thesis, and the passing of the required examinations. The degrees Mechanical Engineer (M. E.) and Civil Engineer (C. E.) will be granted to Bachelors of Science who shall have completed the corresponding undergraduate course at this institution, upon the completion of two years of practical experience in their chosen profession, the presentation of a satisfactory paper upon some topic of interest connected with their work, the completion of assigned problems and the passing of the required examinations.

To be accepted as a candidate for an advanced degree, the applicant must be a graduate of the College of Hawaii or of some other college of equal standing. The application should be made in writing to the Committee on Advanced Degrees not later than October 1st, and should be accompanied by the applicant's diploma and a certified statement of the work done along the lines the applicant purposes to follow. In case the amount of undergraduate work is deemed insufficient, the applicant, if accepted, may be required to take other undergraduate courses, which will not be credited towards the advanced degree.

A matriculation fee of five dollars is required of all candidates for advanced degrees.

The minimum requirement for the master's degree is the satisfactory pursuance of advanced work, under direction of a special committee, for at least one year at the College, or for at least two years *in absentia*. In addition, the candidate must meet the thesis requirements and pass the required examinations.

The advanced work may be restricted to one subject only,

or to a major and one minor, or to a major and two minors; but at least one-half the work must be in the major, and the minors must be so correlated with the major as to satisfy the Committee on Advanced Degrees that the candidate is working with a definite purpose. Credit towards the advanced degrees will be given only for courses marked with an asterisk (full credit) or a dagger (half credit). See detailed Statement of Subjects of Instruction.

The general subject of the thesis, together with the written approval of the chairman of the committee in charge, must be furnished to the Committee on Advanced Degrees not later than December 1st of the year in which the degree is to be taken.

The completed thesis must be presented to the Committee on Advanced Degrees at least one week before the date set for the candidate's examination, and must win the Committee's approval as demonstrating the candidate's ability both to do original work and also to present the results of that work in creditable form. The thesis, accompanied by the written approval of the chairman of the Committee on Advanced Degrees, will be returned for use in the examination or for binding. Before the candidate is granted a diploma, a type-written copy of the thesis, on pages 8x10½ inches in size, substantially bound in stiff covers, and bearing the written approval of the professor in charge, must be deposited in the Library as the permanent property of the College.

The examination for the degree will be conducted by the committee in charge of the candidate's work, and may be either written or oral or both written and oral. It shall be open to all members of the faculty. Requests for examinations should be made in writing to the Committee on Advanced Degrees not later than April 15th, and the Committee will announce the time and place of the examination not later than May 1st.

SCHOLARSHIPS.

Honolulu Chamber of Commerce Freshman Scholarship.—A scholarship of \$100, offered to the graduate of a Honolulu preparatory school passing the best examinations in algebra, geometry, Hawaiian history and English.

Honolulu Chamber of Commerce Agricultural Scholarship.

An annual scholarship of \$100 awarded to an upper classman taking the course in agriculture or the Agricultural division of the course in Sugar Technology.

Hilo Board of Trade Scholarships.—Annual scholarships of \$100, awarded by a committee of the Hilo Board of Trade to residents of East Hawaii who desire to take a full regular course at the College of Hawaii.

University Club Sophomore Scholarship.—This scholarship of \$100 is awarded for the Sophomore year to that needy student who makes the best record in the work of the Freshman year.

Applications for scholarships other than those of the Hilo Board of Trade should be addressed to the President of the College not later than May 1.

COURSES AND OUTLINES

COURSE IN AGRICULTURE.

The Course in Agriculture is designed to give the student an intimate knowledge of the fundamental principles which underlie agriculture as a science and a profession, and thus to equip him for effective service either in practical farming, agricultural education, or research work. Agricultural science comprehends a wide range of subjects, and includes something from nearly every department of human learning. The natural sciences of geology, chemistry, physics, botany, zoölogy, bacteriology, and physiology are directly and intimately related to it. Not in the sciences alone should the agricultural student be broadly educated, but also in mathematics, languages, history, and economics.

In outlining this course the object sought is first to teach the general laws governing the relationship of growing crops and living animals to soil, climate, and surroundings. The method is by lectures, supplemented by laboratory investigations and field experiments. This study of the fundamentals will be required of all students who intend to specialize in any advanced line of agricultural work.

Following this fundamental work the special applications and modifications appertaining to particular crops and problems are studied. Electives are offered in the Junior and Senior years to allow the student to make his course more general, or to specialize along preferred lines.

OUTLINE OF COURSE IN AGRICULTURE.

FIRST YEAR.

	Name of Course.	Credits 1st Sem.	Credits 2nd Sem.
English Composition	English 1	3	3
*Language or History	Fr. 1, Ger. 1 or H. & E. 6.....	3	3

* Freshmen may take either German 1 or French 1 provided they have not had the language selected in preparatory school, or not taken it more than one year there. Freshmen who have had two or more years of either language may take either (a) the elementary course in the other language, or (b) Mediaeval History, H. & E. 6.

	Name of Course.	Credits 1st Sem.	Credits 2nd Sem.
Mathematics	Math. 1 & 2.....	3	3
Chemistry	Chem. 1	3	3
Botany	Bot. 1 & 2.....	3	3
Drawing	M. D. 1	2	2
*Special Freshman Physics.....	Phys. 1	3	3

SECOND YEAR.

English Literature	English 3	3	3
**Language or History	Fr. 3, Ger. 3 or H. & E. 5.....	3	3
Qualitative Analysis	Chem. 4	3	3
Zoölogy	Zoölogy 1	3	..
Plant Physiology	Bot. 6 .....	..	3
Surveying	Civ. Eng. 1.....	2	2
Physics	Phys. 2.....	3	3

THIRD YEAR.

Entomology	Ent. 1 & 2.....	3	3
Agriculture	Agric. 1	5	5
Agricultural Chem.	Chem. 9	3	3
†Geology	Geol. 1 .....	..	3
††Bacteriology	Bot. 4	3	..
Elective .....	.....	3	3

FOURTH YEAR.

Tropical Crops	Agron. 1	3	..
Temperate Zone Crops.....	Agron. 2 .....	..	2
Plant Breeding	Agron. 3 .....	..	3
Sugar Cane Production	Agron. 4	4	..

* Required of Freshmen not offering entrance credit in Physics.

** Sophomores who have had the equivalent of two full college years of either French or German may substitute History 5 for Language.

† Given in alternate years, offered in 1917-18; in 1916-17 replaced by elective (3 credits).

†† Given in alternate years, offered in 1916-17; in 1917-18 replaced by elective (3 credits).

	Name of Course.	Credits 1st Sem.	Credits 2nd Sem.
Animal Husbandry	A. H. 1 and 2...	3	3
Economics	Hist. & Econ. 3..	3	..
*Elective .....	.....	3-7	8-12

*In 1916-17 and alternate years, Seniors are required to take Bacteriology (Bot. 4). In 1917-18, and alternate years, Seniors are required to take Geology 1.

COURSES IN ENGINEERING.

The Courses in Engineering are planned to give thorough training in the fundamental principles upon which professional engineering practice is based, and to illustrate the application of these principles by the solution of numerous practical problems. The courses embrace the main divisions of engineering, mechanical and civil, the essential features of each being touched upon sufficiently to provide a good foundation for future practice. For the first two years the prescribed work is the same for all students in engineering. At the beginning of the third year students commence their special subjects. All differences between the two lines of work are minimized as far as is consistent with thorough training and proper administration. Persons entering these courses are expected to be well prepared in the physical sciences and in mathematics up to and including solid geometry and plane trigonometry. (See Entrance Requirements, p. 16.) It is desired to emphasize the necessity of thorough preparation in order that the more serious work of mastering technical subjects may not be hampered by lack of proper groundwork.

The general plan provides a broad foundation in English, mathematics, chemistry, and physics, accompanied by drawing and shop work during the first two years. Realizing the value of general culture to the successful engineer, liberal provision has been made for the humanities, including modern languages, history, astronomy, and political economy, with a view to their influence upon the student's future professional usefulness. The work of the last two years is more technical and professional in its nature, embracing the study of the principles involved in

power development by means of the various prime movers, including steam engines, water wheels, gas and gasoline engines, and steam turbines; and also a critical study of the design of such machines, and of the materials entering into their construction, as well as practical tests to determine their working efficiency and economy of operation. It is aimed to fit graduates to assume gradually, as practical experience is acquired, those administrative responsibilities which are more and more devolving upon men of technical training, and to become ultimately skilful practical engineers. So far as possible, the importance of each subject covered is illustrated by the application to some work which is met with in actual practice. It is also intended that the courses shall be valuable from an educational viewpoint; therefore, while the student is learning each subject both theoretically and practically, the training of his mind is kept in view as well as the needs of the profession.

The course in mechanical engineering is designed to afford training in general engineering, covering in addition thereto, the more purely mechanical subjects, exercises in electrical measurements and testing, in sugar technology, in hydraulics, and in the engineering of power plants. This general scope of subjects affords insight into actual industrial and engineering practice, and to this end the collateral training of the faculties is insured by courses in the laboratories, work shops, and the drafting room. In the drafting room the student learns to make working drawings and blue prints of machine parts and engineering structures, and finally works out original designs. Instruction in the shops and laboratories gives familiarity with materials and mechanisms, skill in handling tools and appliances, an understanding of the practical possibilities of machinery and processes, and an acquaintance with shop and laboratory limitations affecting the principles of design and manufacture. The course thus embraces, in addition to theoretical training, the use of tools and the value of different methods of executing work from the standpoint of economic construction.

OUTLINE OF COURSES IN ENGINEERING.

		Credits	
		1st Sem.	2nd Sem.
Analytic. Geometry and Trig...	Math. 3.....	5	..
English Composition	English 1	3	3
*French, German or History...	Fr. 1, Ger. 1 or H. & E. 6.....	3	3
General Chemistry	Chem. 1	3	3
Mechanical Drawing	M. D. 1	2	2
Algebra and Calculus.....	Math. 4 .....	..	5
Wood Technology	M. A. 1	2	2
†Special Freshman Physics....	Phys. 1	3	3

SECOND YEAR.

Calculus	Math. 5 & 6....	3	3
Descriptive Geometry	M. D. 3.....	2	2
English Literature	Eng. 3	3	3
‡French, German or History...	Fr. 3, Ger. 3 or H. & E. 5....	3	3
Foundry Practice	M. A. 2.....	..	2
Forging	M. A. 3	2	..
General Physics	Phys. 2	3	3
Surveying	C. E. 1	2	2

The work of the first two years is the same for all students in Civil or Mechanical Engineering.

CIVIL ENGINEERING.

THIRD YEAR.

		1917-1918		1918-1919	
		1st Sem. Credits	2d Sem. Credits	1st Sem. Credits	2d Sem. Credits
Analytical Mechanics...	C. E. 2	4	..	4	..
Astronomy	Math. 7	3	..	..	..
Bacteriology	Bot. 4 .....	..	..	3	..
Chem. for Engineers...	Chem. 23	2	2	..	..
Dendrology	Bot. 3	2	..	..	..
Elec. Measurements...	Phys. 3 .....	..	..	2	..

*See first footnote p. 21.

† Required of students who do not offer Physics for entrance.

‡ Sophomores who have had the equivalent of two full college years of either French or German may substitute History 5 for Language.

		1917-1918		1918-1919	
		Credits	Credits	Credits	Credits
		1st Sem.	2d Sem.	1st Sem.	2d Sem.
Geology	Geol. 2 .....	..	..	..	3
Hydraulics	C. E. 7	3	..	..	..
Hydraulic Construction.	C. E. 8 .....	..	3	..	..
Materials	M. E. 2 .....	..	..	..	2
Materials Laboratory...	X. E. 4 .....	..	3	..	3
Municipal Engr.	C. E. 9 .....	..	..	3	3
Political Economy	H. & E. 3.....	3	..	..	..
Railroad Surveying ...	C. E. 10	3	3	..	..
Steam Machinery	M. E. 1 .....	..	..	3	..
Structural Mechanics...	C. E. 3 .....	..	4	..	4
Topographical Surv.					
and Drawing	C. E. 4 .....	..	..	3	3
Electives .....	————— .....	..	3	..	..

FOURTH YEAR.

Astronomy	Math. 7	3	..	..	..
Bacteriology	Bot. 4 .....	..	..	3	..
Bridge Design	C. E. 6 .....	..	3	..	3
Chem. for Engineers...	Chem. 23	2	2	..	..
Concrete and Masonry					
Structures	C. E. 12.....	..	3	..	3
Contracts and Specifi-					
cations	M. E. 8 .....	..	..	..	2
Dendrology	Bot. 3.....	2	..	..	..
Elec. Measurements...	Phys. 3 .....	..	..	2	..
Geology	Geol. 2 .....	..	..	..	3
Hydraulics	C. E. 7.....	3	..	..	..
Hydraulic Construction.	C. E. 8.....	..	3	..	..
Materials	M. E. 2 .....	..	..	..	2
Municipal Engineering.	C. E. 9.....	..	..	3	3
Political Economy....	H. & E. 3.....	3	..	..	..
Railroad Surveying....	C. E. 10.....	3	3	..	..
Steam Machinery	M. E. 1.....	..	..	3	..
Structural Design	C. E. 5.....	3	..	3	..
Topographical Surv.					
and Drawing	C. E. 4.....	..	..	3	3
Elective .....	————— .....	..	3	..	..

MECHANICAL ENGINEERING.

THIRD YEAR.

	1917-1918		1918-1919	
	Credits 1st Sem.	Credits 2d Sem.	Credits 1st Sem.	Credits 2d Sem.
Analytical Mechanics ..C. E. 2.....	4	..	4	..
Chem. for Engineers...Chem. 23	2	2	..	..
Elec. Machinery .....E. E. 1.....	..	..	..	3
Elec. Measurements....Phys. 3 .....	..	..	2	..
Engr. Laboratory.....X. E. 1 & 4....	..	..	2	3
Hydraulics .....C. E. 7.....	3	..	..	..
Hydraulic Construction.C. E. 8.....	..	3	..	..
Kinematics .....M. D. 4.....	2	..	2	..
Machine Design .....M. D. 5.....	..	3	..	3
Machine Shop Methods.M. A. 4.....	..	..	2	..
Materials .....M. E. 2 .....	..	..	..	2
Steam Machinery .....M. E. 1.....	3	..	3	..
Structural Mechanics..C. E. 3.....	..	4	..	4
*Electives—————	3	6	3	3

* Sugar Technology 1 recommended as an elective.

FOURTH YEAR.

Chem. for Engineers...Chem. 23	2	2	..	..
Elec. Measurements....Phys. 3 .....	..	..	2	..
Engr. of Sugar Plants.M. E. 6.....	4	..	4	..
Engr. Laboratory.....X. E. 1 & 4....	..	..	2	3
Engines .....M. E. 5.....	..	3	..	3
Political Economy....H. & E. 3.....	3	..	3	..
Hydraulics .....C. E. 7.....	3	..	..	..
Hydraulic Construction.C. E. 8.....	..	3	..	..
Mach. Shop Methods...M. A. 4.....	..	..	2	..
Sugar Technology....Sug. Tech. 2..	4	..	4	..
Specifications and Con- tracts .....M. E. 8.....	..	..	..	2
Materials .....M. E. 2 .....	..	..	..	2
Steam Engine Design..M. D. 7.....	..	2	..	2
Electives—————	3	6	3	6

COURSES IN SUGAR TECHNOLOGY.

The Courses in Sugar Technology are designed primarily for the student who, on leaving college, intends to enter into active service in some branch of the sugar industry. Although these courses, since they prepare for one particular industry, might be termed highly specialized, the importance of a sound training in general science has not been overlooked, the first two years being devoted largely to English, mathematics, physics, and chemistry. In the third and fourth years, enough special instruction in subjects pertaining directly to the sugar industry is given so that the man who completes this course should have sufficient technical understanding to prove of some immediate value in a subordinate position on a plantation, and yet not have his future progress hampered by an inadequate theoretical training.

The cane sugar industry, as carried on in the tropics, comprises in itself two quite distinct branches; the growing of cane, and its manufacture into sugar. Inasmuch as it would be extremely difficult, if not impossible, to give thorough instruction in both these branches in four years, the courses in Sugar Technology are offered in two divisions.

Agricultural Division. The first two years are identical with the Course in Agriculture. In the third year quantitative analysis and organic chemistry are taken up in addition to strictly agricultural topics, for the reason that sugar production is probably more dependent on chemistry than is any other branch of agriculture. Sugar analysis is also required, as familiarity with this work is often required of a field chemist. The fourth year allows a liberal amount of electives to those students who wish to specialize in some one subject. The lectures on cane sugar manufacture are required in this year, as it is desirable that the agriculturist have some knowledge of what happens to the cane after he has grown it.

Engineering Division. The first year is identical with the Courses in Engineering, while the second year differs only in the substitution of qualitative analysis for advanced mechanical drawing. Chemistry is continued in the third year, together with the most essential of the engineering subjects. Students in this divi-

sion take sugar analysis and sugar manufacture together with those of the Agricultural division.

During the summer vacation between the third and fourth years a minimum of eight weeks' work on one of the plantations is required of students in both divisions. To obtain credit for this, a written report of work performed is required.

The second semester of the fourth year is devoted almost entirely to practical work. Arrangements are being made whereby students may be permitted to serve a special apprenticeship on one or more of the plantations near Honolulu, and, under the direction of the men there in charge, actually perform the manual labor required at the various stations of the mill and boiling house, spending several weeks or more if necessary in each department, so as to perfect themselves in the duties there required. First hand knowledge of the quantity and quality of labor required for each operation in sugar manufacture is thus obtained, which should prove of great advantage to the student when he is called upon later to fill an executive position.

Students will be required during this apprenticeship to take careful notes of the equipment necessary, time required and labor involved in each operation, and will meet at stated times for discussion and comparison of notes, with a view toward fixing the relationship between the theoretical principles previously studied and their practical application.

OUTLINE OF COURSES IN SUGAR TECHNOLOGY.

AGRICULTURAL DIVISION.

First and Second Years the same as Course in Agriculture.

THIRD YEAR.

		Credits 1st Sem.	Credits 2nd Sem.
Organic Chem.	Chem. 5 & 6	4	4
Quantitative Anal.	Chem. 10	3	3
Sugar Analysis	Sugar T. 1	3	3
Entomology	Ent. 1 & 7	3	3
Agriculture	Agric. 1	5	5
Field Practice	Sugar T. 3	6	..

FOURTH YEAR.		Credits 1st Sem.	Credits 2nd Sem.
Sugar Manufacture	Sugar T. 2	4	..
Sugar Cane Production	Agron. 4	4	..
Economics	H. & E. 3	3	..
Tropical Crops	Agron. 1	3	..
Electives .....	.....	2-6	..
Factory Practice	Sugar T. 4 .....	..	16

ENGINEERING DIVISION.

First Year the same as Course in Engineering.

SECOND YEAR.

English	Eng. 3	3	3
*Language	Fr. or Ger.	3	3
Physics	Phys. 2	3	3
Qualitative Anal.	Chem. 4	3	3
Surveying	C. E. 1	2	2
Calculus	Math. 5 & 6	3	3
Shop Work	M. A. 2 & 3	2	2

THIRD YEAR.

Organic Chem.	Chem. 5 & 6	4	4
Quantitative Anal.	Chem. 10	3	3
Sugar Analysis	Sugar T. 1	3	3
Mechanics	C. E. 2 & 3	4	4
Steam Mach.	M. E. 1	3	..
Electrical Mach.	E. E. 1 .....	..	3
Electrical Measurements	Phys. 3	2	..
Field Practice	Sugar T. 3	6	..

FOURTH YEAR.

Sugar Manufacture	Sugar, T. 2 .....	..	4
Hydraulics	C. E. 7 .....	..	4
Engineering Laboratory	X. E. 1 .....	..	2
Engineering of Sugar Plants	M. E. 6 .....	..	4
Economics	H. & E. 3 .....	..	3
Factory Practice	Sugar T. 4 .....	..	16

* Sophomores who have had the equivalent of two full college years of either French or German may substitute History 5 for Language.

COURSE IN GENERAL SCIENCE.

The General Science Course is designed for those students who do not wish to enter upon the strictly limited programs of study of the more professional courses of Engineering, Agriculture, and Sugar Technology. It is intended that each student shall have a knowledge of the elements of a considerable range of subjects, and at the same time specialize in some field sufficiently to become acquainted with its more advanced phases and proficient in its methods of work. In order to accomplish this result the student is allowed considerable latitude in the selection of studies, and yet required to carry the major part of his elective work in some one group of sciences.

In order to graduate in the General Science Course the student must have passed the prescribed studies of the first and second years and have satisfactorily completed not less than a total of 128 credits. One of the three groups—Physical Sciences, Biological Sciences, or Domestic Arts and Sciences—must be selected, and not less than 60 per cent of the elective work of each year taken in this major group.

In the group of studies designated as Physical Sciences, the student has the opportunity of electing work in Chemistry, Physics, and Mathematics, thus becoming trained to take up work as a chemist or as an instructor in the physical sciences.

If the student prefers work in the group known as Biological Sciences he has the privilege of choosing such subjects as Botany, Zoölogy, and Entomology.

The aim of Group C, Domestic Arts and Sciences, is to provide for the higher education of women in the general principles of home administration. The work offered is mainly of a scientific, technical, and artistic nature, and gives training along both practical and esthetic lines. In the electives and in the required work in Humanities, ample opportunity is given for the study of cultural subjects and of such others as may be of interest to individual students.

OUTLINE OF GENERAL SCIENCE COURSE.

PRESCRIBED COURSE.

FIRST YEAR.

		Credits 1st Sem.	Credits 2nd Sem.
English Composition	Eng. 1	3	3
*French, German or History...	Fr. 1, Ger. 1 or H. & E. 6	3	3
Chemistry	Chem. 1	3	3
Drawing	M. D. 1 or A.&D. 1	2	2
†Special Freshman Physics.....	Phys. 1	3	3
Electives	—————	2-9	2-9

SECOND YEAR.

English Literature	Eng. 3	3	3
**French, German or History..	Fr. 3, Ger. 3 or H. & E. 5	3	3
Electives	—————	10-14	10-14

ELECTIVE WORK.

Group A.

PHYSICAL SCIENCES.

1st Year	***2nd Year	††3rd and 4th Years
Math. 1, 2, 3, 4.	Math. 5, 6	Math. 7, 8, 9, 10
	Phys. 2	Chem. 5, 6, 9, 10, 15, 16, 23
	Chem. 3, 4	Sugar Tech. 1 & 2
	Geol. 1, 2	Phys. 3
	C. E. 1	C. E. 2, 3
		M. E. 1
		E. E. 1

* See first footnote p. 21.

† Required of all Freshmen who do not offer entrance credit in Physics.

** Sophomores who have had the equivalent of two full college years of either French or German may substitute History 5 for Language.

*** First year electives are also open to Sophomores.

†† First year electives taken by Juniors and Seniors count half credit only. Second year electives are open to Juniors and Seniors.

Group B.

BIOLOGICAL SCIENCES.

1st Year	*2nd Year	†3rd and 4th Years
Bot. 1, 2	Bot. 6, 7, 10	Bot. 4, 11
Physiol. 1	Zoöl. 1, 2	Zoöl. 3, 4, 5
Zoöl. 7	Ent. 1, 2	Ent. 4, 5, 11, 13, 15, 16
	Biol. 1	Agri. 1
		Agron. 3
		Psychol. 1

Group C.

DOMESTIC ARTS AND SCIENCES.

D. S. 1	Art & Des. 3	Art & Des. 5, 6, 7
D. S. 1a	D. S. 9	D. S. 8, 11
Bot. 1, 2	D. S. 2	Chem. 22 (D.S. 5)
Physiol. 1	Zoöl. 1	Bot. 4
Zoöl. 7		Ent. 10
		Eng. 4-10
		Hist. & Econ. 1-6
		Fr. 5, 6
		Ger. 5, 6
		Psychol. 1

HUMANITIES: Elective in all groups but not counting as major electives except as noted above. See pp. 50-53.

* First year electives are also open to Sophomores.

† First year electives taken by Juniors and Seniors count half credit only. Second year electives are open to Juniors and Seniors.

DETAILED STATEMENT OF SUBJECTS OF INSTRUCTION

(Arranged in Alphabetical Order.)

AGRICULTURE.

LANDS. About sixty acres of the College lands between the College buildings and the Manoa stream have been reserved for the farm. A part of this is now under cultivation, growing various crops both for experimental purposes and as a source of feed for the farm animals. Another part is used for pastures which are well fenced. The rest which is still covered with rock, cactus and algaroba trees is being cleared and brought under cultivation as rapidly as possible. A 12-inch irrigation line from the Manoa stream provides ample water for all necessary irrigation. A splendid road recently constructed from the rock gathered from the adjacent fields forms the axis of the farm and makes all fields and farm buildings easily accessible.

BUILDINGS AND LABORATORIES. The agricultural laboratory in the main building is well equipped with the necessary apparatus for carrying on the laboratory experiments in connection with class room work as well as individual research work. The apparatus for the study of soil physics is unusually complete. The laboratory also contains a collection of typical Hawaiian soils, seeds, dried plant specimens, feed stuffs, fertilizers and animal models.

The buildings on the College farm consist of a piggery, milking shed, dairy, horse stable, feeding shed for cattle, shed for farm machinery, tool house and three new laborers' cottages. Most of these buildings are largely built of concrete and are absolutely sanitary in every respect.

LIBRARY. An extensive collection of books dealing with agricultural subjects is found in the College Library. This library also contains a rather complete list of the U. S. Department of Agriculture publications and bulletins as well as those of the various state experiment stations. The standard agricultural magazines are received weekly.

LIVESTOCK. The College possesses a herd of fine dairy

animals of both the Holstein and Guernsey breed, Tamworth and Berkshire swine, and the necessary horses to do the farm work. Poultry will be added as soon as the ground on the new poultry site can be cleared.

GENERAL AGRICULTURE.

1. AGRICULTURE. A general course including a survey of agricultural progress, the principles underlying plant growth, development and improvement, a study of soils as the basis of all crop growth, the study of our leading economic crops, the principles of animal breeding and selection, the feeding and care of animals and a survey of specimens of the important breeds. Lectures, recitations and laboratory periods. About one-fourth of the laboratory work will be actual work on the College farm with required observations, in order to familiarize the students with common farm operations which are essential as a basis for scientific agriculture. Prerequisites: Botany, 1, 2 and 6; Zoology, 1; Chemistry, 1 and 4; Physics, 1. Mon., Tue., Sat., at 8; Thu., 8-11; Fri., 10-12. 1st and 2nd semesters, 5 credits each.

Professor Henke.

AGRONOMY.

†1. TROPICAL CROPS. Study of characterization, distribution, methods of cultivation, preparation, transportation and marketing of tropical crops. Prerequisite: Agriculture, 1. Lectures and laboratory periods. Tue., 9-12; Fri., 9; Thur., 1:30-4. 1st semester, 3 credits.

Asst. Prof. Clark.

2. TEMPERATE ZONE CROPS. A study of the growing, harvesting and improvement of the leading temperate zone crops. Lectures and laboratory. Prerequisite: Agriculture, 1. Mon. and Wed., 9. 2nd semester, 2 credits.

Professor Henke.

†3. PRINCIPLES OF BREEDING. A study of the underlying principles and their practical application in the improvement of plants and animals. Lectures, readings and laboratory work. Prerequisite: Agriculture 1. Fri., 8; Mon. and Wed., 1:30-4. 2nd semester, 3 credits.

Professor Henke.

*4. SUGAR CANE PRODUCTION. A study of varieties of cane,

their planting, cultivation, irrigation, fertilization and harvesting. Includes visits to various experimental fields and plantations. Lectures, recitations and laboratory periods. Wed., 8; Sat., 9; Mon. and Wed., 1:30-4. Prerequisite: Agriculture 1. 1st semester, 4 credits.
Professor Henke.

SOILS.

†1. PRINCIPLES OF SOIL PHYSICS AND FERTILITY. Origin, composition, tilth and fertility of soils with special reference to those found in the Hawaiian Islands. Prerequisite: Botany 1, 2 and 6, Zoology 1, Chemistry 1 and 4, Physics 1. Lectures, laboratory and recitations. Hours to be arranged. 1st semester, 4 credits.
Professor Henke.

ANIMAL HUSBANDRY.

1. BREEDS OF DOMESTIC ANIMALS. A general survey of the races and breeds of domestic animals, with special reference to adaptation of types to particular uses. This course will comprise studies of the correlation of conformation to purpose, to be illustrated by actual practise in judging and scoring, to note deviation from, and conformity to, the ideally perfect individual of the type. Prerequisite: Agriculture 1. Mon., 9; Fri., 8; Thur., 9-12. 1st semester, 3 credits.
Asst. Prof. Clark.

2. ANIMAL NUTRITION. CARE AND FEEDING. Studies of the comparative composition and digestibility of feeding stuffs; the essentials for maintenance of health; the compounding of rations to secure rapid growth, and the most economical production of meat, wool, fat, eggs, milk and other environmental factors to the growth and economic production of domestic animals. Prerequisite: Animal Husbandry 1. Mon., 9; Fri., 8; Thur., 9-12. 2nd semester, 3 credits.
Asst. Prof. Clark.

3. DAIRYING. The production, methods of handling, and marketing of milk and milk products; the feeding and care of animals for profitable milk production; a study of milk, butter-fat, and the by-products; the diseases of dairy animals; the breeding and improvement of dairy herds; milk testing and separation. Prerequisite: Agriculture 1. Hours to be arranged. 1st semester, 3 credits.
Asst. Prof. Clark.

3. **POULTRY CULTURE.** A study will be made of the different types and the more important breeds of each type with respect to their origin, use, method of feeding, housing, general care, marketing, etc.

Excursions will be made to poultry plants in and about the city of Honolulu. Some practise in comparative judging will also be given. Text-book: Robinson's "Principles of Practical Poultry Culture." Hours to be arranged. 1st and 2nd semester, 3 credits.
Asst. Prof. Clark.

RESEARCH WORK.

Situated in an ideal climate where out-door experimental work can be carried on twelve months in the year, the College of Hawaii affords a splendid place for research work in agriculture. Graduates of mainland universities and colleges who wish to familiarize themselves with tropical agriculture will find unusually good opportunities for research and original investigations at the College of Hawaii. Credit by arrangement. 1st and 2nd semesters.
Professor Henke.

ENGINEERING.

DRAWING. The drafting room equipment includes a number of first-class adjustable tables and desks, fitted with all accessories, complete for work; also an extensive outfit for blue printing, and many special instruments, such as parallel attachments for tables, railroad curves, splines, protractors, planimeters, special scales, drafting machines, and computing instruments. The library of the College contains a special section on the general subject of mechanical drawing, which is accessible at all times for student use.

SHOP. The equipment for wood working and pattern making embraces ten pattern makers' benches, each equipped with a full complement of tools, for the regular use of the students, with many special tools for illustrative purposes; also a number of machine tools for wood working, including a band saw, scroll saw, grinding machine, universal saw bench, hand planer, surfacing planer, boring machine, universal trimmer, a number of small wood lathes, and a large pattern makers' lathe. The equipment is designed to conform to the best practise in such work, in that the machinery is arranged in groups, and is

driven throughout by electric motors, thus giving the student correct ideas upon proper arrangement and operation.

The forge equipment is arranged on the down-draft plan, and embraces ten sets of forges and anvils, with complete outfits of tools, specially adapted to the work of instruction. The forges are served by a common pressure blower and a separate exhaust, each of which is operated by an individual electric motor drive.

TESTING LABORATORY. In connection with the wood working and forge laboratory, the College maintains a laboratory for testing materials of construction, including wood, iron, steel, and cement, and also provides facilities for fuel testing. The equipment of the testing laboratory includes a 150,000 lb. capacity Riehle universal testing machine, with automatic and autographic attachments, for tension, compression, and transverse tests of large specimens; a small Riehle machine for testing specimens up to 10,000 lbs. in transverse strain; an Olsen torsion machine for torsion tests up to 50,000 in.-lbs.; a special Olsen machine of 40,000 lbs. capacity for compression tests of cement and concrete cubes; and a standard Riehle 2000 lb. machine for briquettes. These machines are provided with a complete assortment of the necessary special instruments, such as extensometers, compressometers, deflectometers and gauges, thus making possible the accurate measurement of deformation over a wide range of tests. In addition to the above, the testing laboratory also includes an extensive equipment of molds, sieves, Vicat needles, moist closets, drying ovens, and other minor accessories necessary to carry out practical tests of cements and concrete in any of the usual forms.

LIBRARY. Students in engineering are encouraged and required to make frequent and continuous use of the library in connection with the regular courses of instruction. The library contains a large and well selected collection of standard technical books, besides many periodicals pertaining especially to engineering. The collection includes sets of Transactions and Proceedings of the four National Engineering Societies, together with bound volumes of the Engineering News back to and including the year 1876, which, taken together, constitute an excellent working library of current practice in each of the main branches of engineering.

MECHANIC ARTS (M. A.).

1. WOOD TECHNOLOGY. Woodworking, comprising the different operations of planing, rabbeting, plowing, notching, splicing, mortising, framing, dove-tailing, laying out work, and the general use of carpenters' tools, followed by practice in wood turning with special reference to manufacturing operations, and the construction of patterns for foundry work. Practice in the use of woodworking machinery as aid to rapid and accurate work. Instruction by lectures at the beginning of the periods, followed by work under the supervision of the instructor. Freshmen. 2 semesters, 2 credits each. Mon., Wed. 1:30-4.

Mr. McTaggart.

2. FOUNDRY PRACTICE. Includes various operations of molding, core making, and the melting and pouring of iron and brass, supplemented by lectures on special processes, machine molding, and general foundry practice. Prerequisites: M. A. 1, and M. D. 1. Sophomores. 2nd semester, 2 credits. Mon., 10; Thur., 1:30-4.

Mr. McTaggart.

3. FORGING. Includes upsetting, swaging, punching, bending, drawing out, forming, and welding. Practice in the working and tempering of the various kinds of steel, with special reference to their use for cutting tools for wood and metal working. Each student is required to forge and temper a complete set of chisels and lathe tools for his own use in the machine shop. Prerequisites: M. A. 1, and M. D. 1. Sophomores. 1st semester, 2 credits. Fri., 10-4; Wed., 10-12:30.

Mr. McTaggart.

4. MACHINE SHOP METHODS. Machine shop methods and general practice, including the selection and working of metals for specific purposes, the economical and rapid production of finished parts as exemplified by the best modern machine shop practice. Prerequisites: M. A. 2 and 3, and M. D. 3. Required of Juniors in Mechanical Engineering. 1st semester, 2 credits. Hours to be arranged.

Mr. —

DRAWING AND MACHINE DESIGN (M. D.).

1. MECHANICAL AND FREEHAND DRAWING. Elementary drafting, which includes freehand sketching, freehand lettering, use of instruments, conventional sections, drawing from copies

and models (using parts of machines from the mechanical laboratory as models), the making of shop drawings, tinting and shading, tracing, and blue-printing; in which particular attention is given to lettering, general neatness, and accuracy. Texts: Jamieson's "Elements of Mechanical Drawing." French's "Engineering Drawing." The cost of materials and instruments required is about \$40.00. Freshmen. 2 semesters, 2 credits each. Tue., Thu., 1:30-4.
Professor Young.

3. DESCRIPTIVE GEOMETRY. Descriptive geometry, with special reference to its application to practical work in the drawing office, embracing lectures and drawing room practice in which a large number of problems of a practical nature are worked out. Prerequisites: M. D. 1, and Math. 3 & 4. Sophomores. 2 semesters, 2 credits each. Tue., 1:30-4; Thur., 11-1:30.
Professor Keller.

4. KINEMATICS. The velocity ratios of various motions, the construction of gears, cams, quick-return motions, and the design of trains of mechanism. Special attention is paid to methods of calculation, and the use of computing devices, as an aid to rapid work. Lectures and drawing room exercises. Prerequisites: M. D. 3, and Math. 5 & 6. Junior Mechanical Engineers. 1st semester, 2 credits. Hours to be arranged.
Professor Young.

5. MACHINE DESIGN. Class room and drafting room work, covering the calculation of strength and stress, the principles of design of machine parts; the general features involved in the arrangement of conveying and transmission systems, the computation of machine details, unit working stresses, and the relation of design to shop possibilities and shop practice.

Each student is assigned problems for actual computation from the principles of this and preceding courses. Solutions of problems must be comprehensive, with regard to strength of parts, adjustment, accessibility, cost of maintenance, appearance, cost of production, and interchangeability. All proportions must be determined from the fundamental principles involved. Text: Unwin's "Machine Design," Parts I and II. Prerequisite: M. D. 4. Junior Mechanical Engineers. 2nd semester, 3 credits. Hours to be arranged.
Professor Young.

7. STEAM ENGINE DESIGN. Exercises in the drafting room, supplemented by lectures and library reference, covering the calculation and design, together with complete assembly and detail drawings, of a steam engine for a given power and specified service. Prerequisites: M. D. 5, C. E. 2 & 3. Senior Mechanical Engineers. 2nd semester, 2 credits. Hours to be arranged.

Mr. ———

MECHANICAL ENGINEERING (M. E.).

1. STEAM MACHINERY. The fundamental laws governing the transformation of heat into work, embracing the properties of gases, laws of expansion, heat measurement, the mechanical equivalent of heat, properties of steam, construction and study of steam tables, and heat analysis as applied to steam and internal combustion engines. The solution of a large number of problems of a practical nature is required. Lectures and recitations. Prerequisites: Math. 5 & 6, M. D. 3. Junior Mechanical Engineers, Senior Civil Engineers, and Juniors in Sugar Technology, Engineering Branch. 1st semester, 3 credits. Mon., 10; Wed., Fri., 9.

Professor Young.

2. MATERIALS OF ENGINEERING. Lectures and recitations on the properties and requirements for materials used in engineering construction, including wood, iron, steel, and concrete. Methods of manufacture as affecting quality of material, standard tests employed to secure the proper grades of material, and standard specifications. Prerequisites: Math. 5 & 6, M. D. 3. Junior Mechanical and Civil Engineers. 2nd semester, 2 credits. (Alternates with Chemistry 23, and will be given in 1918-1919). Mon., Fri., 11.

Professor Young.

5. STEAM, GAS, AND OIL ENGINES. Special types of steam engines and steam turbines; internal combustion engines, and details pertaining thereto, as follows: fuel gases and fuel oils, their physical properties and calorific values; the various gases suitable for power, and methods of producing them; the gas engine cycle, and the historical development of internal combustion engines, gas and gasoline engines; limitations of efficiency, indicator diagrams, gas engine auxiliaries, and appliances of gas power; mechanisms for control of air, ignition, and regula-

tion; the use of alcohol for power, modern types of engines, problems in design, methods of cooling, valves and valve gears, and efficiency tests: followed by discussion of special applications; the automobile engine, arrangement of cylinders, actual capacity, carburetors, transmission gears, the driving of electric generators; general economic considerations, influence of cost of fuel and plant cost on choice of prime movers; comparison of reciprocating, turbine, and gas power plants. Prerequisite: M. E. 1. Senior Mechanical Engineers. 2nd semester, 3 credits. Tue., Fri., 9; Sat., 8. *Mr. ———.*

6. ENGINEERING OF SUGAR PLANTS. Lectures and drafting room exercises, involving the application of the fundamental principles of engineering practice to modern sugar works, including grinding and evaporating machinery, boiler and engine plant, conveying machinery, industrial railways, arrangement of buildings, layout of plant, and other general and special engineering considerations affecting the making and refining of sugar. Prerequisites: M. E. 1. Senior Mechanical Engineers and Seniors in Sugar Technology, Engineering Branch. 1st semester, 4 credits. (Will not be given in 1917-1918). Hours to be arranged. *Mr. ———.*

8. CONTRACTS AND SPECIFICATIONS. Lectures on contracts, touching upon points likely to be of value to engineers, together with such principles of law as should be understood by the engineer who is entrusted with the drawing of contracts, followed by a detailed study of typical contracts and specifications for engineering work of various kinds. Prerequisites: M. E. 1. or C. E. 9. Text: Tucker's "Contracts in Engineering." Senior Mechanical and Civil Engineers. 2nd semester, 2 credits. (Will not be given in 1917-18). Mon., 10; Wed., 9.

Professor Keller.

ENGINEERING LABORATORY (X. E.).

1. MECHANICAL LABORATORY. Lectures and laboratory practice, the lectures covering the general method of measurement and testing, methods of recording data and computing results, forms for reports, factors affecting efficiency, and the equipment required for various physical tests; laboratory practice, including

the use of engineers' computing devices; the ordinary slide rule, the Fuller spiral rule, the Thatcher rule, the Goodchild chart, the calibration of gauges, thermometers, scales, and indicator springs; the testing of lubricants, indicator and planimeter practice, calorimetric determination of heating value of fuels, tests of steam calorimeters, dynamometer tests, hydraulic ram and water meter tests, water wheel tests, and the efficiency of steam boiler and simple steam engine. Prerequisites: M. A. 2 & 3, Math. 5 & 6, M. D. 1. Junior Mechanical Engineers and Seniors in Sugar Technology, Engineering Branch. 1st semester, 2 credits. (Will not be given in 1917-18). Tue., 10-1; Fri., 1:30-4.

Professor Keller.

4. MATERIALS LABORATORY. Laboratory practice in testing the materials of construction, involving complete tests of specimens of wood, iron, steel, and concrete in their various forms. Special attention is given to the preparation and testing of specimens of concrete, both plain and reinforced, in the form of cubes, columns, beams, and girders. The facilities available for such work are ample, and the instruction given covers a large number of practical tests, thus affording the student valuable means of familiarizing himself with the behavior of such materials under stress. Prerequisite: C. E. 2. Junior Civil and Mechanical Engineers. 2nd semester, 3 credits. Wed., 10-1; Fri., 1:30-4; Sat. 10-12:30.

Professor Keller.

ELECTRICAL ENGINEERING (E. E.).

1. ELECTRICAL MACHINERY. The fundamental principles governing the design and operation of dynamo-electrical machinery, and the theory and construction of armatures, field magnets and commutators of direct current generators, motors, motor-generators, boosters, and regulators, followed by a brief treatment of alternating current machines, transformers, and transmission systems. Methods of calculation, graphical analysis, and the solution of practical problems are emphasized. Text: Gray's "Principles and Practice of Electrical Engineering." Prerequisites: Mathematics 5 & 6, Physics 1 & 2, M. E. 1. Junior Mechanical Engineers, and Juniors in Sugar Technology, Engineering Branch. 2nd semester, 3 credits. (Will not be given in 1917-18). Mon., Wed., 1:30; Sat., 8.

Professor Young.

CIVIL ENGINEERING (C. E.)

1. SURVEYING. Plane surveying, supplemented by lectures and drafting room exercises. The use of the chain, tape, compass, transit and level, and practice in the manipulation of these instruments in the field. The drafting room work includes practice in the computations that the surveyor is called upon to make, and plotting from original notes. Text: Breed and Hosmer's "Principles and Practice of Surveying." Vol. I. Prerequisites: M. D. 1, Math. 1 & 2, or 3 & 4. Sophomores in Engineering, Agriculture, and Sugar Technology. 2 semesters, 2 credits each. Mon., Wed., 1:30-4. *Professor Keller.*

2. ANALYTICAL AND APPLIED MECHANICS. The fundamental principles of the various branches of applied mechanics, and the use of higher mathematics in the solution of problems relating to engineering work. Includes the study of analytical statics, composition and resolution of forces, application to rigid bodies, centers of gravity, centers of mass, friction, work, flexible cords, funicular polygon, the catenary, and loaded chords, together with a large number of problems to illustrate special and general methods of solution. The analytical theory of kinetics is developed, and special attention is given to the laws of motion, variable forces, constrained motion, central forces, impact, energy, dynamics of prime movers, moments of inertia, rotary motion, and the simple and compound pendulum. Text: Church's "Mechanics of Engineering." Prerequisites: Math. 5 & 6. Juniors in Engineering and Sugar Technology; Engineering Branch. 1st semester, 4 credits. Tue., Wed., Thu., Sat., 8.

Professor Keller.

3. STRUCTURAL MECHANICS. The resistance and elasticity of materials in tension, compression, and shearing stress, and the study and calculation of riveted joints, simple beams, cantilevers, restrained beams, safe loads, elastic curves, deflections, beams of uniform strength, columns, temperature stresses, and horizontal shear in beams, together with the solution of numerous practical problems. Text: Church's "Mechanics of Engineering." Prerequisite: C. E. 2. Juniors in Engineering and Sugar Technology, Engineering Branch. 2nd semester, 4 credits. Mon., Tue., Wed., Thur., 8. *Professor Keller.*

4. SURVEYING AND DRAWING. Recitation and field and draft-

ing work, covering the various methods of making and plotting topographical surveys, including the theory and use of the plane table, stadia, sextant, and solar attachment to the transit. Students are required to make and reduce observations illustrating the methods of base line measurement, triangulation, and precise leveling. Text: Brøed and Hosmer's "Principles and Practice of Surveying," Vol. II. Prerequisites: Math. 5 and 6, and C. E. 1. Junior Civil Engineers. 2 semesters, 3 credits. (Alternates with C. E. 10, and will not be given in 1917-18.) Thur., 10, 1:30-4; Wed., 10-1. *Professor Keller.*

5. STRUCTURAL DESIGN. Lectures and drafting exercises, in which the student computes the stresses and designs the members for a plate girder bridge and a steel building truss. Includes the making of complete detail drawings and specifications, done under close supervision and carefully checked. The important general points are covered by lectures, minor points being taken up with individual students during the progress of the work. Text: Merriman and Jacoby's "Roofs and Bridges," Parts I and II. Prerequisite: C. E. 3. Senior Civil Engineers. 1st semester, 3 credits. Hours to be arranged. *Professor Young.*

6. BRIDGE DESIGN. Lectures and drafting exercises following C. E. 5 and covering the complete design of a single track through bridge for a given conventional loading, and including all computation, the making of complete engineers' drawings, and the specifications. Text: Merriman and Jacoby's "Roofs and Bridges," Parts II and III. Senior Civil Engineers. 2nd semester, 3 credits. Hours to be arranged. *Professor Young.*

7. HYDRAULICS. Lectures and recitations covering the more important principles of hydraulics which govern and treat of fluids at rest, hydrostatic pressure, manometers, and Pitot tube, Venturi meter, strength of pipes, pressure of water against walls and dams, earth pressure, barometric leveling, flow of liquids through pipes and over weirs, fluid friction, loss of head, flow of water in open channels, Kutter's formula, impulse and resistance of fluids, the Pelton water wheel, overshot, breast and undershot wheels; turbines and reaction wheels, and the general practice of turbine testing. The laboratory practice includes the gauging and measurement of flow in channels and over weirs, tests of

water motors of various types, tests of hydraulic rams, and pumping machinery of various kinds. Text: Daugherty's "Hydraulics." Prerequisites: C. E. 2 and 3. Senior Civil and Mechanical Engineers. 1st semester, 3 credits. (Alternates with C. E. 9, and will be given in 1917-18). Mon., Thur., Sat., 9.

Professor Keller.

8. **HYDRAULIC CONSTRUCTION.** Lectures, recitations and reports covering the more important hydraulic constructions. The work is divided into three parts, as follows: water storage, including reservoir capacity, available sources of supply, the design of spillways and flood channels; irrigation engineering, including methods of distribution, construction of flumes, tunnels, and ditches, and also touching upon the agricultural problems involved; harbor engineering, including a study of various types of wharves, methods of dredging, and harbor improvement. Prerequisites: C. E. 2, 3 and 7. Senior Civil Engineers. 2nd semester, 3 credits. (Alternates with C. E. 9, and will be given in 1917-18). Mon., Thur., Sat., 9.

Professor Keller.

9. **MUNICIPAL ENGINEERING.** Lectures and recitations, including the general principles and methods of construction and cost of earth, macadam, and gravel roads; various kinds of pavements; sidewalks; city ordinances and regulations covering construction; civic art; city water supply; waterworks, and fire protection; the methods of sewage and garbage disposal; the hydraulics of sewers; the relation of rainfall to storm flow. Part of the course is devoted to municipal transportation problems now handled by the various public service commissions. Texts: Blanchard & Drowne, "Textbook on Highway Engineering," Turneaure & Russell's "Public Water Supply," Metcalf & Eddy, "American Sewerage Practice," Vol. III; Robinson's "Civic Art," and Engineering Periodicals and U. S. Gov't. Reports. Junior Civil Engineers. 2 semesters, 3 credits each. (Alternates with C. E. 7, and C. E. 8, and will not be given in 1917-18.) Mon., Thur., Sat., 9.

Professor Keller.

10. **SURVEYING.** Railroad surveying, construction, and economics. Field work and recitations, covering the methods of establishing grade lines, laying out circular and transition curves, the reconnaissance, preliminary, and location surveys for a railroad; earth work computation, maps, profiles, plans of structures,

and estimates. Prerequisites: C. E. 1, Math. 5 & 6. Texts: Raymond's "Railroad Surveying," Webb's "Railroad Construction," Searles' "Field Engineering," and Crandall's "Transition Curve." Senior Civil Engineers. 2 semesters, 3 credits each. (Alternates with C. E. 4, and will be given in 1917-18). Thur., 10; Wed., 10-1; Thur., 1:30-4. Mr. ———.

12. CONCRETE AND MASONRY STRUCTURES. The properties of stone, brick, and concrete, and their uses in engineering structures, such as foundations, retaining walls, piers, abutments, and dams; including the design of arches and dams in stone, and the design of reinforced concrete structures, such as beams, girders, columns, floor slabs, and highway bridges. Lectures and drawing room work, supplemented by library reference. Prerequisites: C. E. 2, 3, & 4. Texts: Hool's "Concrete Construction," Vols. I, II, III. Senior Civil Engineers. 2nd semester, 3 credits. Hours to be arranged. Professor Young.

DOMESTIC ARTS AND SCIENCES.

The Division of Art and Design is provided with two well lighted rooms in the main building, a small kiln room equipped for firing purposes, an office, and a store room for supplies. The Ceramic and Drawing studios are equipped with casts, drawing models, color charts, Maxwell wheel and disks, pottery, Oriental brasses, illustrative designs, photographs and stereopticon slides on architectural and allied subjects.

The Division of Domestic Science is provided with a cooking laboratory, a dining room, a sewing laboratory, and an office. The cooking laboratory is equipped with work tables sufficient to accommodate a class of sixteen students at a time, individual cooking outfits for practical work, gas stoves, scientific apparatus, charts, and illustrative material; the dining room is furnished with all necessities for serving of meals. The sewing laboratory is equipped with cutting tables, machines, dress forms, fitting room, lockers, electric iron, pressing table, charts and illustrative material sufficient for a class of twelve students at one time.

ART AND DESIGN.

1. **FREEHAND DRAWING.** Study of type models; freehand perspective; drawing in outline and in light and shade from ornamental forms, natural objects, and casts; memory sketching; charcoal composition. 1st and 2nd semesters, 2 credits each. Laboratory, 5 hours. Open to regular and special students. Required of students in Domestic Arts and Sciences. Tue. Thur. 1:30.

Professor Chipman.

3. **COLOR AND DESIGN.** Theory of color, study of color values and harmony, making of color scales and charts; instructions in the principles and practice of design as expressed in art line, dark and light, and color; costume design; interior household decoration. Prerequisite: Course 1. 1st and 2nd semesters, 2 credits each. Lecture and laboratory, 5 hours. Mon. 10 to 12; Wed. 10 to 12.

Professor Chipman.

5. **HISTORY OF ARCHITECTURE.** Study of the development of architectural styles of the ancient Egyptians, Chaldeans, Greeks, and Romans, and of the Mediæval (Byzantine, Romanesque, Gothic) and Renaissance periods. Consideration of conditions, materials, etc., in their effect upon architecture. 1st semester, 1 credit. Fri. 9.

Professor Chipman.

6. **HISTORY OF SCULPTURE AND PAINTING.** Historical and appreciative study of ancient and mediæval sculpture and of the great schools of painting. Discussion of principles of art structure and composition in relation to the masterpieces. Prerequisite: Course 5. 2nd semester, 1 credit. Fri. 10.

Professor Chipman.

7. **CERAMIC DESIGN AND PORCELAIN DECORATION.** Study of the principles of proportion and subordination which govern line and area composition and their application to specific problems in original design; discussion of the methods of pottery and porcelain manufacture, and of the composition of ceramic colors, glazes, lustres, and metals; study of good shapes in porcelain; application of original designs to suitable porcelain forms in mediums adapted to the ware used; practice in the firing of ceramic ware. Prerequisite: Course 3. 1st and 2nd semesters, 3 credits each. Lectures and laboratory. Tue. 10 to 12, Thur. 9 to 12.

Professor Chipman.

All work of students in Art and Design remains in the Department during the College year. The College reserves the right to retain for a period of two years such work as it may select. Credits will be given for extra work above that required in the outlined courses.

DOMESTIC SCIENCE.

1. TEXTILES. A study of fabrics, their beginnings in the arts and industries of primitive life, the development of spinning and weaving, modern processes of manufacture, economic values, and their effect on social conditions; the methods of identifying fabrics, garment making and simple drafting. Lectures, discussions and laboratory work. 2 semesters, 3 credits each. Open to regular and special students. Required of students in Domestic Arts and Sciences. Fri. 10, Mon., Wed. 1:30-4.

Asst. Professor Lee.

1a. COOKING. A course in plain cooking. The purpose of the course is to give a working knowledge of the fundamental principles of cookery, and to give practice in the cooking processes in order to develop skill and efficiency in handling materials and apparatus. 2 semesters, 2 credits each. Lectures and laboratory work. Required of students in Domestic Arts and Sciences. Laboratory fee, \$5 a semester. Tue., Thur. 11 to 1.

Asst. Professor Lee.

2. SELECTION AND PREPARATION OF FOOD. The preparation of food materials, based on a knowledge of their composition and the chemical changes effected by heat and moisture, and the cooking processes that give best results in retaining nutritive constituents in most digestible form; together with advanced practical work in selection and preparation of meals. Lectures, discussions, and laboratory. Prerequisites: Chemistry 1, and D. S. 1a. 2 semesters, 3 credits each. Laboratory fee, \$5 a semester. Required of Sophomores or Juniors in Domestic Arts and Sciences. Fri. 11 to 1; Sat. 10 to 12.

Asst. Professor Lee.

5. DIETETICS. Composition and Utilization of Foods. See Chemistry 22. Required of students in Domestic Arts and Sciences.

Professor Dean.

8. **MILLINERY.** The construction and trimming of hats, beginning with the use of foundation materials; making of wire frames from given dimensions, and copying from models, pictures, and original designs. Open to 3rd and 4th year students. 2nd semester, 2 credits. Hours to be arranged.

Asst. Professor Lee.

9. **DRESSMAKING.** The principles of dressmaking; the taking of accurate measurements, the making and altering of patterns, the choice and economical cutting of material; the making of gowns and crinoline modeling. Lectures, discussions, and laboratory work. Prerequisites: Domestic Science 1; Art and Design 1; prerequisite or parallel, A. & D. 3. 2 semesters, 3 credits each. Tue., Thur., 1:30 to 4. *Asst. Professor Lee.*

11. **FOOD INVESTIGATION.** The working out of special problems in connection with foods, as:—the economic side of the food question; uses and application of preservatives; menu planning; marketing; domestic storage; experimental work with food materials raised in the Hawaiian Islands. Prerequisites or parallel: D. S. 2 and 5 (Chem. 22). 2 semesters, 3 credits each. Laboratory work, reading and discussions. Required of Seniors in Domestic Arts and Sciences. Hours to be arranged.

Asst. Professor Lee.

HUMANITIES.

ENGLISH.

1. **COMPOSITION.** The principles of exposition, description, and narration; analysis of illustrative specimens; frequent written exercises, and personal conferences with instructor; occasional exercises in oral composition; collateral reading. Designed to lead not only to correctness of expression, but also to a knowledge of constructive principles. Required of all freshmen. Prerequisite: the successful completion of at least three years of high school English or the equivalent. 1st and 2nd semesters, 3 credits each. Mon., Wed., Fri., 11. *Professor Andrews.*

†2a. **ADVANCED COMPOSITION.** Designed for students wishing

further practice in writing, especially in exposition. Prerequisite: English 1. 1st semester, 2 credits. Hours to be arranged.

Professor Andrews.

3. ENGLISH LITERATURE. The study of representative works in prose and poetry from Shakespeare to Tennyson; Long's *English Literature*, *Century Readings in English Literature*, *Romeo and Juliet*, *Henry IV (First Part)*, *Hamlet*, *The Fortunes of Nigel*, *Henry Esmond*, *Barnaby Rudge*, *Adam Bede*. Frequent written reports on assigned topics. Required of all sophomores. Prerequisite: English 1. 1st and 2nd semesters, 3 credits each. Mon., Wed., Fri., 8.

Professor Andrews.

†4. AMERICAN LITERATURE. The study of representative poems, essays, and fiction. Prerequisite: English 3. 3 credits. Hours to be arranged.

Professor Andrews.

†5. PUBLIC SPEAKING. A study of the principles underlying oral expression; practice in public speaking. Prerequisite: English 1. 1st semester, 2 credits. Hours to be arranged.

Professor Andrews.

*6. ARGUMENTATION AND DEBATE. A study of the principles of argumentation; analysis of representative orations; practice in the writing of briefs; extemporaneous speaking. Prerequisite: English 5. 2nd semester, 2 credits. Hours to be arranged.

Professor Andrews.

†7. THE NOVEL. A study of the novel as a literary form; analysis of representative novels; collateral reading, reports, and discussions. Prerequisite: English 3. 1st semester, 2 credits. Hours to be arranged.

Professor Andrews.

†8. THE SHORT STORY. The principles of the short story, analysis of representative stories; collateral reading; practice in short story writing; conferences with instructor. Prerequisite: English 3. 2nd semester, 2 credits. Hours to be arranged.

Professor Andrews.

†9. SHAKESPEARE. The development of the drama in England; the Elizabethan playhouse; Shakespeare's immediate predecessors; his great tragedies and comedies, with special reference to their dramatic structure. Prerequisite: English 3. 2nd semester, 2 credits. Hours to be arranged.

Professor Andrews.

*10. THE DRAMA. The principles of dramatic structure; analysis of Elizabethan and recent plays; practice in construction of scenarios and the writing of one act plays. Prerequisites: English 1 and 3 with honor grade. 2nd semester, 2 credits. Hours to be arranged. *Professor Andrews.*

Courses 2a and 4-10 are elective courses and will be given on request. Requests for any of these courses should be made at least two months before the beginning of the semester in order that the necessary text books may be obtained. The class hours will be fixed to suit the convenience of the class.

FRENCH.

1. ELEMENTARY FRENCH. Phonetics, copying, reading of easy connected prose, conversation, grammar. Acquirement of a practical vocabulary. 1st semester, 3 credits. Mon., Wed., Fri. 8. *Asst. Professor Heuer.*

2. ELEMENTARY FRENCH. Conversation, reading and studying of connected prose, easy studies of French cities, life and customs, grammar continued. Prerequisite: Course 1. 2nd semester, 3 credits. Mon., Wed., Fri., 8. *Asst. Professor Heuer.*

3. INTERMEDIATE FRENCH. Conversation, reading and studying of more advanced prose by George Sand, Daudet, Mérimée, Loti, La Fontaine, grammar review, translation only when necessary. Required of all sophomores who have taken courses 1 and 2. 1st semester, 3 credits. Mon., Wed., Fri., 9. *Asst. Professor Heuer.*

4. INTERMEDIATE FRENCH. Conversation, reading of standard works by Molière, Corneille, Racine, La Fontaine, Hugo, Rolland, with written compositions thereon. Study of history. Scientific reading, syntax. Prerequisite: course 3. 2nd semester, 3 credits. Mon., Wed., Fri., 9. *Asst. Professor Heuer*

*5. ADVANCED FRENCH. Free conversation and reading; literary study of French classics continued; historians as Voltaire, Michelet, Thiers, etc., studied; discussions of French ideals and characteristics; syntax. Open to students who have attained a

good rank in courses 1 to 4, or who show satisfactory evidence of fitness. 1st semester, 3 credits. Mon., Wed., Fri., 10.

Asst. Professor Heuer.

*6. ADVANCED FRENCH. Lectures on the history and development of French literature; frequent talks and discussions on phases of French life and history; reading outside of class, with written reports thereon. Prerequisite: course 5. 2nd semester, 3 credits. Mon., Wed., Fri., 10. *Asst. Professor Heuer.*

GERMAN.

1. ELEMENTARY GERMAN. Phonetics, copying, reading of easy connected prose, conversation, grammar, acquirement of a practical vocabulary. 1st semester, 3 credits. Tue., Thur., Sat., 8. *Asst. Professor Heuer.*

2. ELEMENTARY GERMAN. Conversation, reading and translation of connected prose; easy studies of German life, customs, and history, grammar continued. Prerequisite: course 1. 2nd semester, 3 credits. Tue., Thur., Sat., 8. *Asst. Professor Heuer.*

3. INTERMEDIATE GERMAN. Conversation, reading and studying of advanced prose by Freytag, Storm, Auerbach. A German magazine, "Aus Nah und Fern," is used, which brings the latest news from all nations and countries. Translation. Grammar review. Required of all sophomores who have taken courses 1 & 2. 1st semester, 3 credits. Tue., Thur., Sat., 9. *Asst. Professor Heuer.*

4. INTERMEDIATE GERMAN. Conversation; reading of standard works of Goethe, Schiller, Lessing; compositions on German history; scientific reading; syntax. Prerequisite: course 3. 2nd semester, 3 credits. Tue., Thur., Sat., 9. *Asst. Professor Heuer.*

*5. ADVANCED GERMAN. Advanced conversation and composition on German ideals, inventions, history and literature. Reading of German writers of the 19th century and modern times in class and outside: Hebbel, Ludwig, Dahn, Hauptmann, Keller, C. F. Meyer, Thomas Mann, etc. 1st semester, 3 credits. Tue., Thur., Sat., 10. *Asst. Professor Heuer.*

*6. ADVANCED GERMAN. Free conversation and compositions, lectures on German literature, history, ideals. Discussions on phases of German life and institutions. Reading of German newspapers and magazines, with written reports thereon. 2nd semester, 3 credits. Tue., Thur., Sat., 10 *Asst. Professor Heuer.*

HISTORY AND ECONOMICS.

1. HISTORY OF MODERN EUROPE. Lectures, recitations, and reading dealing with the disappearance of serfdom, the rise of industrial efficiency, and other phases of modern European history in their bearing on the welfare of the people. 1st semester, 3 credits. Hours to be arranged. *Miss Yoder.*

2. HISTORY OF MODERN EUROPE. Lectures, recitations, and library work dealing with the economic aspects of colonial commerce, manufacture, and labor supply, the development of internal improvements; agriculture, transportation, and industrial expansion. 2nd semester, 3 credits. Hours to be arranged.

Miss Yoder.

3. PRINCIPLES OF POLITICAL ECONOMY. Lectures, recitations, and library work on the meaning and application of the conceptions of wealth, value, money, utility, capital, supply, demand, distribution, wages, profits, rents, interest, and credit. 1st semester, 3 credits. Tue., Thur., Sat., 8.

Miss Yoder.

4. POLITICAL INSTITUTIONS. Lectures, recitations, and library work on the principles of politics and the development of political institutions. Constitutional and administrative laws, with reference to their practical working. Text: Woodrow Wilson's "History of the State." 2nd semester, 3 credits.

Miss Yoder.

5. AMERICAN HISTORY. A course dealing with the rise of South American and Mexican Republics, and the History of the United States. 1st and 2nd semesters, 3 credits each. Mon., Wed., Fri., 9.

Miss Yoder.

6. MEDIAEVAL HISTORY. A course dealing with the problems of the Middle Ages, from 476-1492. 1st and 2nd semesters, 3 credits each. Mon., Wed., Thu., 8.

Miss Yoder.

SCIENCES.

BIOLOGY.

1. FIELD BIOLOGY. An elective course consisting largely of field work, designed to give first-hand knowledge of biological areas. Within easy reach of the College is a great variety of representative biologic regions. The natural history of these type regions is studied *in situ*, and recorded in written reports. One afternoon (1-5 p.m.) per week; four all-day excursions by arrangement. Students registering for this course must provide themselves with suitable tramping clothes and field note book. 2nd semester, 1 credit. Prerequisites: Botany 1, and Zoology 1. Hours to be arranged. *Professors Bryan and MacCaighey.*

GENERAL BOTANY.

The College of Hawaii has an unique location with reference to the all-the-year-round study of the biological sciences. The island of Oahu, upon which the city of Honolulu is situated, is a volcanic doublet, skirted in part by a wide coral plain and reef. The Waianae Range, which forms one portion of the doublet, is of much greater age than the Koolau Range, which forms the other. The Waianae Range includes a striking variety of biological zones, from extensive arid plains and valleys to boggy, foggy summits. The Koolau Range comprises a remarkable series of beautiful valleys, gorges, knife-edged ridges, and peaks covered with dense rain-forest. Between these two ranges that make the main skeleton of the island is an elevated central plateau, deeply dissected by several large gorges. The coastal plain that skirts the island is diversified as to geologic formations and plant societies, and in certain districts is studded with conspicuous secondary volcanic cones of tuff and ashes.

From the standpoint of collegiate studies, all of these regions are quite accessible; many of them are within a half-day's walk, and the most remote can be reached within a day. It is a relatively simple matter to make an expedition to any given region, to transport needful scientific apparatus and equipment, and to continue the studies and collecting for as long a period as is desirable.

There is perhaps no other region in the world, similarly provided with all the conveniences of modern civilized society, where so many widely differing types of tropical environment are so easily available within small compass.

The botanical laboratory is furnished with work tables, lockers, cabinets, reagent and supply cases, electric lamps, tap and distilled water, and numerous gas-burners. Stereopticon projection is available at any time.

The microscope equipment comprises a series of excellent microscopes, including demonstration, projection, portable, photo-micrographic, research, and elementary instruments. Accessories include Abbe camera lucidas, spectro-micrographic equipment; stages, and series of Leitz, Zeiss, Bausch and Lomb, and Spencer lenses. For photo-micrography there is a large Bausch and Lomb horizontal camera.

For work in bacteriology, the laboratory is furnished with sterilizers, incubators, refrigerator, water-baths, paraffin baths, imbedding oven, centrifuges, microtomes, balances, filtration apparatus, a large stock of chemicals, stains, and reagents; and supplies of all requisite glassware.

Standard apparatus for experimental work in plant physiology, as designed by Ganong, Detmer, and Dey Rolles is provided, together with materials for the construction of original apparatus, and for the study of plants in aquaria, thermostats, and other control devices.

1. PRINCIPLES OF BOTANY. The fundamental principles of plant morphology and physiology. A survey of the chief plant groups, with field and laboratory studies of representative types. The evolutionary process is traced through the plant series. Special studies of representatives of angiosperm families, indigenous and introduced. The physiological processes and phenomena of plant life.

Students registering for this course must provide themselves with special laboratory and field note books, and Coulter, Barnes, Cowles "Text-book of Botany," Vol. 1, and Setchell's "Laboratory Practice for Beginners in Botany."

Lectures, laboratory and field work, recitations and assignments. Required of Freshmen in Biological Science and Agriculture. 1st semester, 3 credits (one laboratory period, one field

period, and one discussion period per week.) Fri. 10, Mon., Wed. 1:30 to 4.

Professor MacCaughey.

2. PRINCIPLES OF BOTANY. A survey of the ecological relationships of roots, leaves and stems; studies in the reproduction and dispersal of plants; plant geography; paleobotany and economic botany; evolution.

Courses 1 and 2 form a single general survey of the large and vital facts of botany. They are designed to give the student a working knowledge of the subject, and afford a basis for further study or research. Particular emphasis is given to field work.

Students must provide themselves with Coulter, Barnes, Cowles "Text-book of Botany," Vol. II. Other equipment as for Course 1.

Lectures, laboratory and field work, recitations and assignments. Required of Freshmen in Biological Science and Agriculture. Prerequisite: Botany 1. 2nd semester, 3 credits. Fri. 10, Mon., Wed. 1:30 to 4..

Professor MacCaughey.

†3. DENDROLOGY. A survey of the structure, classification, and life histories of timber trees, from the standpoint of Hawaiian and North American forest conditions; studies of structure as affecting the properties of woods; geographical distribution of timber trees, rate of reproduction, and relation of these to lumber production; the forest flora and fauna; ecological factors, and their influence upon the forest.

Particular attention is given in field and laboratory to the commercial indigenous and imported timbers of Hawaii.

Students registering for this course must provide themselves with special field and laboratory note books, and Stone's "Timbers of Commerce."

In addition to the regular field and laboratory work, attendance is required upon one all-day field trip. Required of Juniors or Seniors in C. E. 1st semester, 2 credits. (Alternates with Course 4; given in 1917-1918.) Tues. 10, Fri. 1:30 to 4.

Professor MacCaughey.

†4. GENERAL BACTERIOLOGY. The lectures cover the field of general bacteriology, emphasizing economic features, especially in relation to industrial processes, and to the public health; systematic studies of families and important genera; detailed surveys of the morphologic and physiologic characters of representative

pathogenic and non-pathogenic species. The keys of Chester are used in laboratory work. Text: Jordan, "General Bacteriology." Botany 1 and 2 form a desirable ground-work for this course. Three three-hour laboratory periods per week. Moore, "Laboratory Exercises in Bacteriology." Required of Juniors or Seniors in Biological Science, Agriculture, and C. E. 1st semester, 3 credits. (Alternates with Course 3; given in 1918-19.) Sat. 11, Tue., Fri. 1:30 to 4.

6. PLANT PHYSIOLOGY. A laboratory and discussion course, with studies of physiological activities of selected plants. Field studies of the physiologic aspects of plant ecology; effects of artificial environment conditions; quantitative studies of nutrition, respiration, growth, and movement; the physiology of reproduction; the significance of tropisms; methods of obtaining precise data; tabulation and interpretation of data; the correct use of apparatus, principles of control, construction of measurement and control devices. Laboratory work is supplemented by reading assignments which culminate in the preparation of a report. Text: Duggar, "Plant Physiology." Required of Sophomores in Agriculture. 2nd semester, 3 credits Tue., Thur. 10, Fri. 1:30.

Professor MacCaughey.

*7. PLANT MORPHOLOGY. A field and laboratory course, covering structural studies of some selected group of plants. Field work; collection and preservation of material; gross and microscopic examination; the important elements of plant structures, from the viewpoint of their development and functions; observations and records of anatomical variations; significance of species, varieties, mutants, etc.; studies of organography; ecologic field work; modifications of roots, stems, leaves, and floral structures; pollination devices, dissemination devices, protective devices, etc. 1st semester, 1 or 2 credits. Open only to Juniors and Seniors who have had botany 1 and 2. (Alternate years, given in 1918-19.) Hours to be arranged.

Professor MacCaughey.

*9. RESEARCH IN GENERAL BOTANY. Nature of work arranged upon consultation. Open only to Seniors in good standing or graduate students who show sufficient preparation and ability to carry on studies of an investigational nature. Hours to be arranged.

Professor MacCaughey.

SYSTEMATIC BOTANY.

The herbarium of the College of Hawaii contains the most complete collection of Hawaiian plants in existence, including some species which have already become extinct, and also many specimens from Australia, the Philippines, Java, Ceylon, Cuba, and Mauritius. The portions of the types and the co-types of plants described by Dr. W. Hillebrand, together with the types of new species, form the most valuable part of the herbarium. The former are part of an assortment of about a thousand sheets of Hawaiian plants secured by the botanist in charge of the herbarium from the Berlin Botanical Museum, where the Hillebrand collection is deposited. In addition, portions of the types of Hawaiian plants described by Dr. Asa Gray were also secured from the Harvard Herbarium, and photographs of other Hawaiian specimens in the Harvard, Berlin, Vienna and Paris museums were taken.

The library of systematic botany contains nearly all the atlases and texts of the early voyages, and is practically complete as far as the original descriptions of Hawaiian plants are concerned. This, with the completeness of the herbarium, makes possible the preparation of monographs on various groups of Hawaiian plants. The library further includes such works as Martius' Natural History of the Palms, the Flora Brasiliensis, many works on continental as well as insular floras, and Das Pflanzenreich, the latest and most up-to-date series of monographs on plant families.

*10. SYSTEMATIC BOTANY FOR ADVANCED STUDENTS. Lectures dealing with the classification of plants, arrangement of families in their natural order, their characteristics and relationship to one another, with special reference to the Hawaiian flora. Laboratory work and lectures. 1st and 2nd semesters, 3 credits. Hours to be arranged. *Mr. Rock.*

*11. ADVANCED RESEARCH WORK IN PHAENOGAMIC BOTANY.

The special study of a certain order or smaller group of flowering plants peculiar to Hawaii. Field and laboratory work. Hours and credits to be arranged. *Mr. Rock.*

CHEMISTRY.

The chemical laboratories are well equipped with apparatus

and supplies for work in general chemistry, qualitative analysis, elementary and advanced quantitative analysis, organic chemistry, sugar technology, and for chemical research. To specify somewhat in detail, the laboratories are supplied with platinum ware, volumetric apparatus, chemical balances, apparatus for gas and oil testing and for food analysis, a bomb calorimeter, polariscopes, spectrosopes, refractometers, and apparatus for work in physical chemistry. Gas, water, and electricity are all at hand, and the equipment of desks and hoods is well adapted to present needs.

1. GENERAL CHEMISTRY. An elementary course in general chemistry, designed to serve either as a foundation for the advanced courses in chemistry or as a general survey of the science for those who do not intend to take further work in chemistry. Students who have had chemistry in a preparatory school are placed in a special section and given more advanced laboratory work. 1st and 2nd semesters, 3 credits each; 2 hours class room and $2\frac{1}{2}$ hours laboratory per week. Required of all Freshmen. Mon., Wed., 10. Lab. Sec. A, Sat. 10 to 12:30—students who have not had chemistry in preparatory school. Lab. Sec. B, Fri. 1:30—those who have had a course in chemistry.

Professor Dean.

3. THEORETICAL CHEMISTRY. A study of the laws and theories of chemistry with special emphasis upon their application in the solution of problems, and upon their value in the interpretation of chemical facts. Prerequisite: Chemistry 1. 1st semester, 2 hours class room per week, 2 credits. Hours to be arranged. Alternate years. Not given in 1918-19.

Professor Dillingham.

4. QUALITATIVE ANALYSIS. Principally a laboratory course, covering the characteristic reactions of the more common metals and acids, and group separations of the same. It includes also blow-pipe methods for analyses of solids and methods for obtaining solutions of solids. Each student analyzes a series of from thirty to forty "unknowns," covering a wide range of inorganic substances. In a lecture or recitation period methods are given and the reactions studied. Prerequisite: Chemistry 1. 1st and 2nd semesters, 3 credits each. Five hours laboratory and one hour class room per week. Text: Harris and Pond's "Manual

of Qualitative Analysis." Sat. 8. Laboratory hours to be arranged.

Professor Dillingham.

†5. ORGANIC CHEMISTRY. The Aliphatic and Aromatic Series. Lectures, collateral reading, discussions, and frequent quizzes. For those who specialize in chemistry and sugar technology this is accompanied by the laboratory course. Prerequisite: Chemistry 1. 1st and 2nd semesters, 3 credits each, 3 hours class room per week. Mon. 9, Wed., Fri. 8.

Professor Dillingham.

†6. ORGANIC CHEMISTRY LABORATORY. To be taken in conjunction with Chemistry 5. A study of the preparation, separation, and analysis of a number of organic compounds. 1st and 2nd semester; 1 credit each. 2½ hours laboratory per week. Hours to be arranged.

Professor Dillingham.

†9. AGRICULTURAL CHEMISTRY. A course consisting of lectures, recitations, supplementary reading, and laboratory periods dealing with the chemistry of air, water, plant and animal life, soils, fertilizers, and insecticides. Prerequisites: Chemistry 1 and 4. 1st and 2nd semesters, 3 credits each; 2 hours class room and 2½ hours laboratory per week. Text: Frap's "Principles of Agricultural Chemistry." Mon. 11, Wed. 9, Wed. 1:30 to 4.

Professor Dillingham.

†10. QUANTITATIVE ANALYSIS. The principles of gravimetric and volumetric analysis, including the determination of the constants of the balance, analyses of a carefully selected series of pure compounds, calibration of glass-ware, acidimetry, alkali-metry and other volumetric methods. Prerequisites: Chemistry 1 and 4. 1st and 2nd semesters, 3 credits each; 1 hour class room and 5 hours laboratory per week. Text: Foulk's "Quantitative Chemical Analysis." Tue. 9. Hours for laboratory work to be arranged.

Professor Dillingham.

*15. CHEMICAL LITERATURE. A library course in which articles appearing in current chemical periodicals are studied. Prerequisites: Chemistry 1, 4, and 10; German 1-4, or their equivalent. 1st and 2nd semesters, 1 credit each; 1 hour class room per week. To be taken in conjunction with Chemistry 16. Hours to be arranged.

Professor Dillingham.

*16. ADVANCED QUANTITATIVE ANALYSIS. Analysis of special

substances, such as foodstuffs, soils, fertilizers, ores, iron, steel, water, etc. Prerequisites: Chemistry 1, 4, and 10. 1st and 2nd semesters, 3 credits each; 7½ hours laboratory per week. Hours to be arranged. *Professor Dillingham.*

*18. CHEMISTRY RESEARCH. The preparation of a thesis on some subject in pure or applied chemistry. Elective course, particularly for graduate students. Hours and credits to be arranged. *Professors Dean, Dillingham, and Walker.*

22. COMPOSITION AND UTILIZATION OF FOODS. A course of lectures covering the composition of foods, chemistry of digestion, and the chemical, physiological, and economical phases of diet. Prerequisites: Chemistry 1 and Physiology 1. 1st and 2nd semesters, 2 credits each; 2 lectures per week. Elective for Juniors or Seniors in the General Science Course. (Alternate years, given in 1918-19.) Tue., 8; Thur., 9.

Professor Dean.

23. CHEMISTRY FOR ENGINEERS. A course of lectures and recitations covering the chemistry of fuels, water, lubricants, and materials used in engineering. Prerequisite: Chemistry 1. 1st and 2nd semesters, 2 credits each; 2 exercises per week. Required of Juniors or Seniors in Engineering. Text: Benson's "Industrial Chemistry for Engineering Students." (Alternate years, given in 1917-18.) Mon., Fri., 11.

Professor Dean.

ENTOMOLOGY.

In Honolulu the student of biology works under especially favored conditions. There is no dormant season; plants and animals are always active and may be collected at the time that they are required, without the necessity that one experiences in northern climes of working largely from preserved material. This constant association with the living things adds materially to the interest in the work.

In all courses a special effort is made to have the student realize that in the study of insects he is dealing with forms which in many cases are of vital importance to his welfare. The lecture and laboratory work are closely correlated, and, in the morphological study, deal principally with a few types, in order to avoid the confusion that arises from a multiplicity of

forms. Carefully planned field excursions and rearing experiments are arranged to bring the student into the closest appreciation of our daily problems.

The elementary courses should be taken in their natural order, and are intended to awaken in the student a keen appreciation of the general principles of insect life. The economy of beneficial species is emphasized, as well as the principal methods for the control of those that are injurious.

The valuable entomological collection is now systematically arranged and permanently housed in standard cabinets. This collection is particularly rich in economic material, and although the greater part represents Hawaiian forms, it is also well supplied with specimens from the South Seas and the United States.

The laboratories are well supplied with Zeiss compound and binocular microscopes, microscopical accessories, camera lucida, dissecting lenses, and the necessary glassware. Rearing and collecting apparatus of a variety of forms is available in sufficient quantity to meet present needs. A photographic room, used in common with other departments, is thoroughly equipped with the most approved cameras and other needful accessories.

In a separate building, on the Campus, is the insectary, which is arranged most conveniently for carrying on experimental breeding and the study of parasites. There is also provision, here, for photographic work, so that illustrations may be made on the spot, of the interesting stages as they develop.

A room adjoining the insectary is the honey-house. This is equipped with a four-frame extractor and tank, together with other paraphernalia, necessary for care of the apiary of 100 colonies.

GRADUATE WORK.

The College occupies an unique position with regard to tropical agriculture, and the biological problems are very distinct from anything that one meets on the mainland. Not only do many interesting problems arise, due to the continuous growth and breeding under our equable climate, but our insular position may add to these. The signal success of the introduction of beneficial insects into Hawaii has probably not been duplicated in any other part of the world.

The modern equipment of the College is at the service of students engaged in research work. Also, the several entomological collections and libraries in Honolulu, which are available for the use of advanced students, add to the attractions of this location for research in entomology.

A candidate for the degree of Master of Science in entomology must have Zoology 1 and Botany 1, or their equivalents, in addition to Entomology 1, 2, 4, 5, and 15.

1. GENERAL ENTOMOLOGY. A study of the general morphology, physiology, and classification of insects. Introductory lectures on the relatives of insects, followed by a consideration of the characteristics of the orders, suborders, and principal families, with life histories and habits of typical species. Laboratory work includes a study of the structures of insects and practice in their classification. The making of a collection by each student offers practical experience in field work. 1st semester, 3 credits; 1 hour class room, 5 hours laboratory. Required in Biological Science, Agriculture, and Sugar Technology. Mon., 10-11 and 1:30-4; Wed., 10-12:30.

Professor Illingworth.

2. GENERAL ENTOMOLOGY. Deals primarily with insects of economic importance. Lectures on the more important insect pests and methods of controlling them. Laboratory work includes a study of the several stages in the life history of our common insects, and the making of a collection showing these. Field observation is emphasized. Prerequisite: Entomology 1. 2nd semester, 3 credits; 1 hour class room, 5 hours laboratory. Required in Biological Science and Agriculture. Mon., 10-11 and 1:30-4; Wed., 10-12:30.

Professor Illingworth.

†4. ELEMENTARY MORPHOLOGY OF INSECTS. An introductory laboratory course. Prerequisites: Entomology 1 and 2. 1st semester, 2 credits; 5 hours laboratory. Required of all students for advanced work in entomology. Hours to be arranged.

Professor Illingworth.

†5. ELEMENTARY SYSTEMATIC ENTOMOLOGY. A laboratory course in the identification of insects, applying the study of wing venation. Prerequisite: Entomology 4. 2nd semester, 2

credits; 5 hours laboratory. Required of students for advanced work in entomology. Hours to be arranged.

Professor Illingworth.

†7. ECONOMIC ENTOMOLOGY OF SUGAR CANE. A general survey of the relation of insects to plants, and to one another. Assigned readings on the principal insect pests of sugar cane, with laboratory work upon the life-histories of the more common local species. Special attention will be given to the very important work accomplished by insect parasites in Hawaii. Prerequisite: Entomology 1. 2nd semester, 3 credits; 6 hours laboratory. Required in Sugar Technology. Agricultural Branch. Tue., 10; Sat., 9-12; Fri., 1:30-4.

Professor Illingworth.

†8. AGRICULTURAL ENTOMOLOGY. A study of the principal insect pests of the farm and garden. Field and laboratory work, with assigned reading, on typical insects attacking domestic plants and animals. Special emphasis placed upon control measures, both natural and artificial. Prerequisite: Entomology 1. 1st semester, 2 credits; 6 hours laboratory. (Alternates with Entomology 10. Given in 1918-19.) Hours to be arranged.

Professor Illingworth.

†10. DOMESTIC ENTOMOLOGY. Insects affecting the home, with suggestions for their control. Lectures and assigned readings on typical household insects. Laboratory work on life-histories of available species. 1st semester, 2 credits; 5 hours laboratory. (Alternates with Entomology 8. Given in 1917-18). Hours to be arranged.

Professor Illingworth.

†11. FOREST ENTOMOLOGY. Insects destructive and beneficial to forest trees. Assigned readings, with laboratory work on available species, to work out life histories and control measures. Considerable actual field work is necessary in this course. Prerequisite: Entomology 1. 2nd semester, 2 credits; 5 hours laboratory. (Alternates with Entomology 13. Given in 1918-19.) Hours to be arranged.

Professor Illingworth.

†13. APICULTURE. A general survey of the life and activities of the honey bee. Assigned readings, with apiary practise, covering the principal features involved in the technique of handling bees. 2nd semester, 2 credits; 6 hours laboratory and

assigned reading. (Alternates with Entomology 11. Given in 1917-18). Hours to be arranged. *Professor Illingworth.*

*15. ENTOMOLOGICAL LITERATURE. A library course dealing with the methods of making bibliographies, and the preparation of technical papers for publication. Prerequisite: Entomology 1, 2, 4, and 5. 1st semester, 1 credit; 3 hours laboratory. Required of students for advanced work in Entomology.

Professor Illingworth.

*16. RESEARCH IN ECONOMIC ENTOMOLOGY. Opportunities for research work in this field are especially attractive, since the problem can be developed throughout the year without interruption. Open only to students who have shown marked ability in the study of entomology. Prerequisites: Entomology 1, 2, 4, and 5. Throughout the year, 3 or more credits a semester. Hours to be arranged.

Professor Illingworth.

GEOLOGY.

1. DYNAMIC AND STRUCTURAL GEOLOGY. Lectures, text, laboratory, and field work; a general survey of the materials of the earth's crust; its construction; the working of the constructive and destructive agencies within the earth and upon its surface, together with a brief history of the earth, and the evolution of plant and animal life upon it. The course is based largely on the geology of North America, but frequent reference is made to the geology of the Islands. An elementary knowledge of physics, chemistry, zoology, and botany is required. 2nd semester, 3 credits. Two lectures, one laboratory period per week. Text: Chamberlain and Salisbury's "College Geology." Required of Juniors or Seniors in Agriculture. (Alternates with Geology 2. Offered in 1917-18.) Tue., Thur., 11; Fri., 1:30-4.

Professor Bryan.

2. GEOLOGY FOR ENGINEERS. Lectures, text, laboratory and field work; the fundamental principles of dynamic and structural geology; the common rock-forming minerals, especially those important in structural materials, including their mode of occurrence, physical features, and origin. Considerable attention is given to rock weathering and soils; surface and underground waters; artesian wells, limes, cements, and plaster; clay and

clay products; coals, petroleum, and other hydro-carbons; road materials and ore deposits. 2nd semester, 3 credits; 2 lectures, 1 laboratory per week. Text: Reis and Watson's "Engineering Geology." Required of Juniors or Seniors in C. E. (Alternate course. Offered in 1918-19.) Tue., 9; Sat., 8; Tue., 1:30-4.
Professor Bryan.

MATHEMATICS.

1. (a) PLANE TRIGONOMETRY. (b) ANALYTIC GEOMETRY. 1st semester, 3 credits. Prerequisites: Algebra and plane geometry. Tue., Thu., 11; Sat., 9.
Professor Donaghho.

2. (a) ALGEBRA. (b) ANALYTIC GEOMETRY. 2nd semester, 3 credits. Prerequisite: Course 1. Tue., Thu., 11; Sat., 9.
Professor Donaghho.

3. ANALYTIC GEOMETRY AND TRIGONOMETRY. (a) Analytic geometry, plane and solid. (b) Spherical trigonometry, with problems from field work with transit and sextant. Prerequisites: Elementary algebra, plane and solid geometry, plane trigonometry. Required of engineering freshmen. 1st semester, 5 credits. Mon., Tue., Wed., Thu., Fri., 9.
Professor Donaghho.

4. ALGEBRA AND INTRODUCTORY CALCULUS. (a) A short course in advanced algebra, including symmetric functions, partial fractions, irrational functions, simultaneous quadratic equations, binomial theorem, the progressions, logarithms, theory of equations, infinite series. (b) A short course in differentiation. Prerequisite: Course 3. Required of engineering freshmen. 2nd semester, 5 credits. Mon., Tue., Thu., Fri., 9.
Professor Donaghho.

5. CALCULUS. Differential and integral calculus. Many problems bearing upon engineering work. Prerequisite: Course 4. Required of engineering sophomores. 1st semester, 3 credits. Tue., Thu., Sat., 10.
Professor Donaghho.

6. CALCULUS. Continuation of course 5. Required of engineering sophomores. 2nd semester, 3 credits. Tue., Thu., Sat., 10.
Professor Donaghho.

7. ASTRONOMY. A brief course in practical astronomy, adapted to the needs of engineering students. Prerequisites: Courses 3, 4, 5, 6. Required of engineering students. 1st se-

mester, 3 credits. (Alternates with M. E. 1; will be given in 1917-18).
Professor Donaghho.

8. ASTRONOMY. A lecture course in descriptive astronomy. 2nd semester, 1 or 2 credits. (Will be offered in 1917-18).
Professor Donaghho.

9. CALCULUS. (a) A list of comparatively simple problems, giving a rapid review of many applications of the calculus. (b) Drill problems, of increasing difficulty. Prerequisites: Courses 5 and 6. 1st semester, 1 or 2 credits.
Professor Donaghho.

10. CALCULUS. Continuation of course 9. 2nd semester, 1 or 2 credits.
Professor Donaghho.

PHYSICS.

The physical laboratory is equipped for student work in mechanics and heat with substantially the material used in Millikan's *College Course* in those subjects. In optics and electricity the following may be mentioned as giving an idea of the grade of apparatus: a Hilger spectrometer, gratings, a Brace spectrophotometer, a Lummer-Brodhun photometer, a Kelvin balance, a Carey Foster bridge and standard resistances, a Leeds and Northrup potentiometer, a variable standard of self and mutual inductance, a Roentgen ray outfit, and a wireless receiving set, with antenna. The laboratory includes a dark-room, and a shop for the construction and repair of apparatus.

1. ELEMENTARY PHYSICS. Mechanics, Heat, Sound, Light, Magnetism, and Electricity. Solution of many numerical problems. Prerequisite: Algebra. 1st and 2nd semesters, 3 credits each; two lectures or recitations and one laboratory period weekly. Required of all Freshmen who do not offer credits in Physics for admission. Tue., Thur., 10, and Fri., 1:30-4 or Sat., 10-12:30.
Professor Romberg.

2. GENERAL PHYSICS. Special attention to Heat and Light, and the theory of electrical measurements. Measurements of precision. Prerequisites: Trigonometry and Physics 1 or its equivalent. 1st and 2nd semesters, 3 credits each; two lectures and one laboratory period weekly. Tue., Thur., 8; Thu., 1:30-4.
Professor Romberg.

3. ELECTRICAL MEASUREMENTS. A laboratory course. Includes measurements of current, voltage, resistance, inductance, capacity, magnetic properties of iron, etc. Prerequisite: Physics 2. 1st semester, 2 credits; two laboratory periods weekly. (Alternate years. Given in 1918-19.) Mon., Wed., 1:30-4.

Professor Romberg.

The department is equipped to give more advanced courses, especially in heat and electricity, and will do so when students are found who desire to take such work.

PHYSIOLOGY.

1. HUMAN AND COMPARATIVE PHYSIOLOGY. Lectures and demonstrations on the elements of physiology, with special reference to the relationships in the anatomy of man and animals. Attention is also given to the vital organs, with reference to health and disease. 2nd semester, 3 credits. Two lectures and one laboratory period per week. Text: Kimber's "Anatomy and Physiology for Nurses." Required of students in Domestic Arts and Sciences. Mon., Wed., 9; Thur., 9-12.

Professor Bryan.

PSYCHOLOGY

1. ELEMENTARY PSYCHOLOGY. Lectures and recitations supplemented by laboratory work in experimental psychology. 1st semester, 3 credits. Tue., Sat., 9; Wed., 1:30.

Professor Andrews.

ZOOLOGY.

The courses in zoology are intended to meet the demands both of elementary and advanced students, and are arranged to take advantage of the wealth of illustrative and research material available in the Island fauna throughout the year.

The Islands have already furnished rich material that has been widely used by philosophical zoologists in their attempts to explain the great fundamental problems of evolution. Abundant opportunity still remains in the Island fauna for original research work in any of the fields of animal life. Persons desiring to specialize in zoological subjects will find ample opportunity and facility for prolonged and serious study.

The required courses are intended to be both cultural and practical, while the advanced courses offered, or those which may be arranged to suit the individual needs of the student, are planned with a view to vocational training along the lines indicated.

The equipment for this work is thoroughly modern. Though not as extensive as in older institutions, it is brought together with reference to the possible future development of the College as an institution for biological research. Present requirements are being well provided for. The lecture room and laboratories are now supplied with such new equipment as is required by regular students. Special appliances are added from time to time as occasion for their use arises.

The collections of specimens and illustrative material are being increased as rapidly as storage space will permit. A teaching equipment of charts, models, photographs, microscope slides, stereopticon slides, and alcoholic specimens is at hand. The laboratories, including a pier laboratory in Honolulu harbor, are conveniently located, and are equipped with a working library, microscopes, dissecting lenses, projecting apparatus, aquaria, and other necessary accessories.

1. INVERTEBRATE AND VERTEBRATE ZOOLOGY. Lectures, text, and laboratory. A study of the structure, development, life histories, classification, relationship, and distribution of animals, with especial reference to the economic importance of many forms. 1st semester, 3 credits; two lectures, one laboratory period per week. Text: Galloway's "Text Book of Zoology." Required of Sophomores in Agriculture. Tue., Thur., 10, Fri. 1:30 to 4.
Professor Bryan.

†2. OCEANOGRAPHY. Lectures, observations, laboratory, and library assignments. A general survey of the ocean as a great natural realm, with a view to bringing out its bearing on the facts underlying such subjects as geology, botany, zoology, evolution, distribution, climatology, etc. Some knowledge of physics, chemistry, zoology, and botany is desired. 2nd semester, 3 credits. Text: Murray and Hjort's "The Depths of the Ocean." Hours to be arranged.
Professor Bryan.

*3. ICHTHYOLOGY. Lectures, field work, laboratory, and research. A technical study of fishes, designed for students desir-

ing a working knowledge of the subject in preparation for serious systematic biological or fish cultural work. All traits of the *pisces* are as fully treated as time will permit, especially those which deal with the evolution and divergence of the various classes and orders. Much of the work is given in the laboratory, where use is made of the abundance of fresh material available from the local market. 1st semester, 3 credits. Text: Jordan's "Guide to Study of Fishes." Hours to be arranged.

Professor Bryan.

*4. ICHTHYOLOGY. Lectures, field work, laboratory, and research. A continuation of course 3, which is a prerequisite. 2nd semester, 3 credits. Hours to be arranged. *Professor Bryan.*

*5. SPECIAL WORK IN ZOOLOGY. Special work along the lines of evolution, variation, heredity, ecology, ornithology, etc., can be arranged for according to the demands of properly qualified students. Hours to be arranged. *Professor Bryan.*

*6. RESEARCH WORK. Opportunities for research work in zoology in Hawaii are especially numerous and attractive, and many problems are of undoubted economic importance. Seniors are encouraged to select at the beginning of the year subjects in which investigational work can be made the basis of a thesis. The subject chosen and the time spent upon it will determine the number of credits allowed. *Professor Bryan.*

7. EVOLUTION AND ANIMAL LIFE. Lectures, text, laboratory work and field excursions. A general course intended to give a lucid, elementary synoptical account of the processes of evolution as they are so far understood. While planned as an introduction to the work in Zoology 1, the course is open to all classes of students, being adapted to the needs of those not specializing in zoology. It is based chiefly upon the more important features of animal ecology and natural history as exhibited by familiar types of animals. The interesting and important facts of animal life as well as the relation between the varied form, structure and habits of animals and their environment is treated from the observer's point of view. 1st semester, 3 credits; one laboratory period per week. Text: Jordan & Kellogg's "Evolution and Animal Life." Tue., Thur. 9, Sat. 9 to 12. *Professor Bryan.*

SUGAR TECHNOLOGY.

The sugar laboratory contains a recent model Schmidt and Haensch saccharimeter, a Landolt-Lippich polariscope for monochromatic light, a Stammer colorimeter, an Abbe-Zeiss and an immersion refractometer, a standardized comparator for measuring tube lengths, a small hand mill, and practically all the miscellaneous apparatus needed in a sugar factory laboratory. A number of old model polariscopes of different types have been donated by plantations, and are of value in demonstrating the theory and construction of the modern instrument.

1. SUGAR ANALYSIS. Laboratory and lecture course intended to fit the student for the position of chemist in a sugar house laboratory.

Among the topics taken up are the theory and construction of the polariscope and the refractometer, the calibration and testing of these and other laboratory apparatus, general laboratory routine, and the fitting out of a sugar laboratory, the methods of sampling and of analysis of the various products met with in a cane sugar factory.

Instruction is also given in sugar house calculations, and considerable time is devoted to the working out of problems involving the yields and losses ordinarily encountered in actual factory work, and the making out of typical laboratory reports such as are required by plantations in the Hawaiian Islands.

In order to take this course the student should have a working knowledge of general chemistry and laboratory manipulations. 1st and 2nd semesters, 3 credits each. Approximately 6 hours per week laboratory, 1½ hours class room. Required of Juniors in Sugar Technology. Thur. 11, Tue., Thur. 1:30 to 4.

Professor Walker.

*2. SUGAR MANUFACTURE. A series of lectures and recitations on the manufacture of sugar, taking up in detail a discussion of the various types of machinery and apparatus employed in the best modern factories and the principles involved in their use, embodying such topics as multiple milling, the effect of various types of roller grooving, pressure and maceration on extraction, clarification of juices, multiple effect evaporation, the eco-

nomical use of steam, sugar boiling, crystallization in motion, and the curing, drying, and preparation of sugars for the market. Though this is primarily a course for cane sugar men, a brief description of the methods employed in beet sugar manufacture and refinery practice is also given, together with a discussion of the various processes for making white sugar direct from cane.

Students are given the opportunity of visiting the nearby plantations and witnessing the processes of manufacture as carried out in actual practice.

It is recognized that theoretical instruction can be of value only when accompanied or supplemented by practical work, and the College will endeavor to secure positions for students who satisfactorily complete this course, so that they may acquire the necessary practice in factory technique and sugar house manipulations under the most favored conditions.

1st semester, 4 credits; 4 hours per week class room. Required of Seniors in Sugar Technology. Mon., Thur., Fri., Sat. 10.

Professor Walker.

*3. FIELD PRACTICE. During the summer vacation between the Junior and Senior years, students in Sugar Technology are required to spend at least eight weeks on a sugar plantation devoting their entire time to acquiring a practical knowledge of the planting, cultivation, irrigation, fertilization, and harvesting of sugar cane. Credit for this work will be granted on the presentation of a satisfactory report covering in full the topics mentioned. 6 credits.

Professor Walker.

*4. FACTORY PRACTICE. A brief apprenticeship in a cane sugar factory, covering the second semester of the Senior year. A sufficient time is required at the mills, fireroom, weighing and liming tanks, juice heaters, settling tanks, filter presses, evaporators, vacuum pans, centrifugals and laboratory for the student to familiarize himself with the operations carried on at these stations. A complete report covering in full the equipment and methods of manufacture observed is required. 16 credits. Open only to Seniors in Sugar Technology.

Professor Walker.

*5. SUGAR TECHNOLOGY. Research. Preparation of a thesis involving a thorough study of the available bibliography of, and original work on, some topic pertaining to the chemistry or manufacture of sugar. 2nd semester, 3-5 credits. Hours to be arranged.

Professor Walker.

DEGREES CONFERRED.

Fifth Annual Commencement, June 5, 1916.

Richard Man Sing Goo

Bachelor of Science in Engineering.

Harold Earl Starratt

Bachelor of Science in Agriculture.

LIST OF STUDENTS

REGULAR STUDENTS.

1916-1917.

GRADUATE STUDENT.

Barnhart, George Harold William, B. S. (College of Hawaii).
2476 Puunui St.

Nelson, John F., A. B. (Colorado College), Mills School—Systematic Botany.

SENIORS.

Case, Aderial Hebard (Sugar Technology), Wailuku, Maui.

Hicks, Leslie Asa (Civil Engineering), 3702 Palolo Ave.

Nicholson, Donald Francis, Jr. (Sugar Technology), 261 Perry St.

JUNIORS.

Ballentyne, Gustave Clinton (Sugar Technology), 1559 Thurston Ave.

Capps, Miss Marjorie, 1714 Anapuni St.

Hee, Tai Bun (Civil Engineering), Republic Lane, Kukui St.

Ho, William Nyuk Lyng (Agriculture), 808 Queen St.

Iyer, Vydinatha Padmanaba (Sugar Technology), 1038 Alapai St.

Ming, John Chun (Civil Engineering), 1144 Asylum Rd.

Ow, Yong Woon (Civil Engineering), Pahoa, Hawaii.

Pahau, Robert K. (Sugar Technology), Liliuokalani Rd.

Tung, Miss Fung Sun (General Science), Bishop Lane.

Tyau, Luke Mau (Agriculture), 1600 Liliha St.

SOPHOMORES.

Brash, Lionel Verner (Sugar Technology), 1294 Emma St.

Fennell, Martin Anthony (Civil Engineering), 782 Kinau St.

Ho, Dung Wui (Civil Engineering), 131 Vineyard St.

Kuwamoto, Maruichi (Sugar Technology), 1950 Beretania St.

Lee, Pok Sil (General Science), Korean Nat. Ass'n Bldg.

Miyamoto, Ichiji (Electrical Engineering), Manoa Valley.

Miyamoto, Yoshio (Mechanical Engineering), Aala Lane.
Morgan, Miss Grace Harriett (General Science, 1729 Keeau-
moku St.
Pong, Kong Tai (Civil Engineering), 361 Vineyard St.
Sharp, Miss Jannatt Victoria (General Science), 2183 Atherton
Rd.
Spencer, Joseph Warren, Fort Kamehameha.
Woo, Jacob Yau-tet (General Science), 1449 Liliha St.
Wung, En Leong, (Engineering), Kohala, Hawaii.

FRESHMEN.

Ai, Raphael Awan Chiu (Civil Engineering), Hoopuloa, S.
Kona, Hawaii.
Bromley, George Cutter (General Science), 735 Sunset Ave.
Bryan, Edwin Horace, Jr. (Sugar Technology), 2421 Armstrong
St.
Chock, Kam Chow (General Science), 1034 Nuuanu St.
Cullen, Herbert Francis (Electrical Engineering), Beretania and
Richards Sts.
Denison, Harry Lea (Sugar Technology), 1657 Bingham St.
Farrington, Miss Ruth (General Science), 1807 Anapuni St.
Hashimoto, Koji (Mechanical Engineering), Mills School.
Kealalio, Daniel (Civil Engineering), 1635 Gulick Ave.
Kim, Gay Bong (General Science), Korean Compound.
Lau, Ah Com (Sugar Technology), 1510 S. King St.
Nicholson, Sydney George (General Science), 261 Perry St.
Poole, Charles Frederick (Sugar Technology), 2401 Koa Ave.
Shimizu, Toshisuke (Agriculture), 1471 Christley Lane.
Watada, Umematsu (General Science), Mills School.
Yang, You Chan (General Science), Korean Compound.

SPECIAL STUDENTS.

Ballentyne, Miss Maud Thelma, 1559 Thurston Ave.
Barclay, Mrs. Annie Roy, Colonial Hotel.
Bartlett, Mrs. Edna Sargent, 1366 King St.
Berg, Mrs. Alice Gillet, 2386 Oahu Ave.
Bon, Mrs. Rebecca Johnson, 2336 Oahu Ave.
Campbell, Mrs. Alice Kimball, 1594 Beretania St.
Chilson, Mrs. Mabel Putnam, Woodlawn.

Chuck, Miss Mary Akwai, 1709 Nuuanu St.
Clark, Mrs. Ellen M., 1429 Makiki St.
Clark, Lester Calvin, Cottage Grove.
Clegg, Mrs. Ruth W., 1562 Thurston St.
Cowan, James Henry, 1319 Wilder Ave.
Cox, Mrs. Catherine Elizabeth Bean, 919 12th Ave.
Curry, Mrs. Gertrude Thomsen, 2668 Oahu Ave.
Damon, Mrs. Gertrude M., Moanalua, Honolulu.
Davis, Florence Spring, 1136 King St.
Dean, Mrs. Leora Parmelee, 2056 Lanihuli Drive.
Elliott, Raymond, Cor. Vineyard and Fort Sts.
Fish, Mrs. D. D., 15th and Palolo, Ocean View.
Fowler, Owen George, Fort Shafter, Honolulu.
Fuchino, Hego, Nuuanu and Vineyard Sts.
Gartley, Miss Eleanor, 2208 Kamehameha Ave.
Genoves, Mrs. Mabel Hill, 1835 Wilder Ave.
Goughler, Mrs. Daisy, 1838 King St.
Grainger, Mrs. Ethel Crandley, 1655 Kewalo St.
Harbaugh, Miss Alice E., Alewa Heights.
Hayashi, Shuichi, 791 Archer Lane.
Haynes, Miss Helen Fern, Kawaiahao Seminary.
Hitchcock, Miss Alleine Lee, 2376 Oahu Ave.
Hoogs, Miss Dorothy Maxwell, 1905 Makiki St.
Horn, Mrs. Violette, 1219 Alexander St.
Hoskins, John Oliver, Fort Shafter.
Hurd, Mrs. Maude J., 2317 Vancouver Highway.
Johnson, Maxwell Oscar, 1701 Makiki St.
Keller, Mrs. Lora T., 2066 Lanihuli Drive.
Kelley, Miss Clare M., 915 Piikoi St.
Knowles, Miss Gertrude Marion, Kamehameha School.
Lightfoot, Miss Emily Louise, King St. and Pawaa Lane.
Louis, Koon Muy, 1756 Fort St.
Low, Miss Laura Louise, 1826 King St.
McChesney, Miss Ruth, 1558 Kewalo St.
Macintyre, Mrs. Florence H., 2326 Armstrong St.
McLean, Mrs. Jennie Lint, 2557 Parker St.
Marques, Mrs. Laura Lister, 2312 Liloa Rise.
Monsarrat, Mrs. Elizabeth F., Courtland Hotel.

Morgan, Miss Ramona Frances, 1817 Kēeaumoku St.
Noble, Miss Doris Vivian, Hyde St.
Noggle, Mrs. Stella Payne, Parker St.
Olds, Clarence James, 1448 Liliha St.
Pohlmann, Mrs. Flora Sigel, 940 12th Ave.
Rodgers, Mrs. Myrtle Smith, Puiwa Lane.
Romberg, Mrs. Margaret King, 2136 Kamehameha Ave.
Searle, Miss Emma, Kapiolani St.
Shelters, Ronald Richard, Fort Shafter.
Singlehurst, Miss Katie Gibson, 55 Bates St.
Stannard, Edward Mahlon, Iolani School.
Swanzy, Miss Nora Hastings, Manoa Road.
Tasartez, Miss Eleanor, Nuuanu St.
Thompson, Mrs. Uldrick, Kamehameha Schools.
Thurston, Miss Margaret Carter, 130 Bates St.
Van Anderson, Mrs. Maude Mason, 3175 Waialae Road.
Walker, Miss Dorothy, 1196 King St.
Weinrich, William, Robinson Station, Oahu.
Williams, Kathryn, 1714 Anapuni St.
Winkley, Arthur Henry, 3615 Palolo Ave.
Wirtz, Mrs. Mary E., 2045 Lanihuli Drive.

COLLEGE OF HAWAII PUBLICATIONS

COLLEGE RECORDS.

- (No. 1.) Prospectus of the College of Agriculture and
Mechanic Arts, Territory of Hawaii. Jan. 1, 1908,
pp. 16.
- No. 2. College of Hawaii, Second Annual Catalogue, 1908-
1909. May, 1909, pp. 64.
- (No. 3) Report of the Board of Regents, College of Hawaii,
to the Legislature in accordance with Act 24, 1907.
(1909), pp. 15.
- No. 4. College of Hawaii, Annual Catalogue, 1909-1910.
Feb., 1910, pp. 64.
- No. 5. Botany and Horticulture at the College of Hawaii,
1910-1911. Sept., 1910, pp. 14.
- No. 6. Report of the Board of Regents, College of Hawaii,
1909-1911. Feb. 1911, pp. 15.
- No. 7. Annual Catalogue, 1910-1911. Feb., 1911, pp. 87.
- No. 8. College of Hawaii, Annual Catalogue, 1911-1912.
May, 1912, pp. 88.
- No. 9. College of Hawaii. Report of Board of Regents to
the Legislature of 1913. Feb., 1913, pp. 43.
- No. 10. College of Hawaii, Annual Catalogue, 1912-1913.
April, 1913, pp. 96.
- No. 11. College of Hawaii, Register of Officers and Students,
1913-1914. May, 1914, pp. 8.
- No. 12. College of Hawaii. Report of Board of Regents to
the Legislature of 1915. March, 1915, pp. 45.
- No. 13. College of Hawaii, Biennial Catalogue 1914-1916.
April, 1915, pp. 80.
- No. 14. College of Hawaii, Register of Officers and Students,
1915-1916. Dec., 1915, pp. 12.

BULLETINS.

- No. 1. Rock, Joseph F. Notes upon Hawaiian Plants, with

Descriptions of New Species and Varieties. pp. 20
December, 1911.

- No. 2. De Candolle, Casimir. The Hawaiian Peperomias.
Rock, Joseph F. Descriptions of New Species of
Hawaiian Plants. October 16, 1913, pp. 50, plates.
- No. 3. Warren, Alfred. A Study of the Food Habits of the
Hawaiian Dragon Flies or Pimau. October, 1915.
pp. 45.
- No. 4. Rock, Joseph F. Palmyra Island with a Description
of its Flora. April 19, 1916, pp. 53.

CIRCULARS.

- (No. 1.) MacCaughey, Vaughan. School Gardens in Hawaii.
Oct., 1910, pp. 11.
- No. 2. The Control of Bovine Tuberculosis. June, 1911,
pp. 35. (Reprint of Report Int. Com. Am. Vet.
Medical Association).
- No. 3. MacCaughey, Vaughan. The Extension Work of the
College of Hawaii. May, 1914, pp. 30.

INDEX

	Page		Page
Admission	4, 14-17	Domestic science	49-50
application for	16	Drawing and machine design	39-41
as regular student	14-16	Economics, courses in	54
as graduate student	16, 17-19	Engineering, courses in	37-47
as special student	16	aims and methods	23-24
on examination	15	equipment	37-38
on certificate	14	laboratory	42-43
on College Entrance Ex-		English, courses in	50-52
amination Board	15	entrance	16
to advanced standing	15	Entomology, courses in	62-66
requirements	14-17	equipment	62-63
rules of	4	Entrance requirements	14-19
Advanced degrees	17-19	Faculty	6-8
Advanced standing, admission		Faculty committees	8
to	14	Farm of College	34
Agriculture, Course in	34-37	Fees	13
agronomy	35-36	French, courses in	52-53
animal husbandry	36-37	General Science, course in	17, 31-33
equipment	34-35	outline of course	32-33
outline of course	21-23	Geology, courses in	66-67
subjects of instruction	34-37	German, courses in	53-54
Agronomy, courses in	35-36	Herbarium	59
Animal husbandry, courses in	36-37	History & Economics, courses	
Application for admission	16-17	in	54
Art and design, courses in	48-49	History and organization of	
equipment	47	the College	9-12
Astronomy, course in	67-68	Humanities, courses in	50-54
Bacteriology, courses in	57-58	Library, College	12, 34, 38, 59
Biology, courses in	55	Machine design, courses in	39-41
Botany, courses in	55-59	Masters' degrees	18-19
equipment	55-56, 59	Mathematics, courses in	67-68
Calendar	2-3	entrance	15
Ceramics	48-49	Mechanic arts, courses in	39
Certificate, admission on	14	Mechanical engineering, courses	
Chemistry, courses in	59-62	in	41-42
equipment	59-60	outline of work	25-27
Civil engineering, courses in	44-47	Origin and support of College	9-10
outline of work	25-26	Physics, courses in	68-69
Courses leading to degrees	17	entrance	16
Agriculture	21-23	Physiology, course in	69
Engineering	23-27	Political science, courses in	54
General Science	31-33	Psychology, course in	69
Sugar Technology	28-30	Publications	79-80
Credits defined	13	Regents, board of	5
Degrees granted	17-18, 74	Registration days	4
Domestic arts and sciences,		Scholarships	19-20
courses in	47-50	School certificates	14

	Page		Page
Semesters	13	Humanities	50-54
Special students	13, 16	English	50-52
Standard of instruction.....	11-12	French	52-53
Students, classification of.....	13	German	53-54
Students, names of	75-78	history and economics.....	54
Subjects of instruction	34-73	Sciences	55-73
Agriculture	34	botany	55-59
agronomy	35	chemistry	59-62
animal husbandry.....	36-37	entomology	62-66
soils	36	geology	66-67
Domestic Arts & Sciences	49-50	mathematics	67-68
art and design.....	48-49	physics	68-69
domestic science.....	49-50	physiology	69
Engineering	37-47	psychology	69
civil engineering	44-47	sugar technology.....	72-73
drawing and machine		zoology	69-71
design	39-41	Sugar Technology, courses in	72-73
electrical engineering....	43	outline of courses.....	28-30
engineering laboratory..	42-43	Tuition	13
mechanical engineering	41-42	Zoology, courses in	69-71
mechanic arts	39	equipment	69-70

UNIVERSITY OF MICHIGAN



3 9015 06842 5498

